

List of new Project Proposals for 2020-21

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
1	SNTMO M/1/2020	Rapid recovery of nuclear-grade zirconium metal from zircon mineral by plasma-assisted combustion synthesis in ultra-high gravity reactor (Duration: 3 Yrs, 0 Mth)	1. To design and build a plasma-assisted combustion synthesis in an ultra-high gravity reactor (PACS-UHGR) for rapid recovery of nuclear-grade zirconium metal from its source mineral zircon (zirconium silicate). 2. To evaluate the performance of PACS-UHGR under various combinations of operating parameters such as gravity field, plasma power, the mole ratio of the reactive mixture, vessel's dimensions, positioning, etc. 3. To comprehensively study the influence of PACS-UHGR operating conditions on the processing mechanism and metal phase separation. 4. To optimize the processing parameters for efficient recovery of nuclear-grade zirconium metal from zircon mineral. 5. To upgrade the PACS-UHGR system to produce near net shape zirconium and zirconium nitride.	Yugeswaran Subramaniam (Pondicherry University)	3372856.00	Not recommended Subject is not in the mandate of Ministry of Mines. Mismatch between title and objectives Title is about rapid recovery of nuclear grade Zr but the main objective is designing of equipment
2	SNTMO M/2/2020	Investigations on structural panels made from fly ash, coir, palm, sugarcane reinforced green composites (Duration: 3 Yrs, 0 Mth)	? Fabrication of fly ash / coir / palm / sugarcane reinforced epoxy polymer matrix composites for investigating its mechanical / thermal / acoustic behaviors such as tensile, flexural, impact, fatigue, thermal conductivity, thermal buckling and sound absorption coefficient. ? Making structural panels meant for door panels, dry wall, acoustic boards based on the investigations.	G Venkatachalam (VELLORE INSTITUTE OF TECHNOLOGY)	1649550.00	Not recommended Subject is not in the mandate of Ministry of Mines.

File No.Met4-14/3/2020-Metal IV

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3	SNTMO M/3/2020	DEVELOPMENT OF OPTIMIZED PROCESS TO PRODUCE CLEAN COAL (Duration: 3 Yrs, 0 Mth)	1. To collect coal samples from coal mines. 2. To design set-up for carrying out ultrasonic pre-treatment of coal and perform experiments. 3. To remove ash content from pre-treated coal through heavy media separation unit i.e. cyclone. 4. To maximize the ash content removal while varying density of medium, cyclone overflow to underflow flow rate ratio, ultrasonic frequency, particle size of coal, etc. 5. To analyse the clean coal obtained in Step 4 to identify the minerals present. Further, to find out the chemicals used to remove these minerals and thus, to decide the stages of chemical leaching. 6. To perform chemical leaching of coal found through heavy media separation process at optimized conditions using different acids such as HF, HNO3, NaOH, H2SO4, etc. in various stages. 7. To optimize the demineralization process while varying parameters such as concentrations of acids, temperature, time, etc. 8. To generate final report of the study.	Shabina Khanam (Indian Institute of Technology Roorkee)	5594200.00	Not recommended Pertains to Ministry of Coal. Subject is not in the mandate of Ministry of Mines.
4	SNTMO M/4/2020	Enhancing the room temperature mechanical properties of magnesium alloys through grain boundary plasticity mechanisms (Duration: 3 Yrs, 0 Mth)	The primary objective of the proposal is to enhance the room temperature ductility of ultra fine grained magnesium binary alloys at high strain rates by grain boundary plasticity mechanisms associated with grain boundary engineering, diffusion and segregation phenomenon. The objectives are mentioned in detail as following: To study (1) The effect of alloying additions such as Zn, Al, Ca, Sn, Bi, Mn etc., (2) The effect of amount of solute addition, (3) The effect of processing route which can influence the grain boundary character and structure, (4) The effect of grain size and thermal heat treatments, (5) Effect of strain rate on the room temperature tensile plasticity of magnesium binary alloys.	DudekulaAlthaf Basha (Indian Institute of Technology Indore)	6483300.00	Not recommended a. Theoretical in nature b.Nonovelty c.No specific alloy mentioned
5	SNTMO M/6/2020	Hybrid plasmonic on-chip optical gas sensor for monitoring harmful gases in underground coal mines - Modeling, Fabrication and Characterization (Duration: 3 Yrs, 0 Mth)	• To review the various challenges for implementing the suggested lab-on-chip plasmonic waveguide-based optical gas sensor for monitoring harmful gases in underground coal mines. Also, to understand the working principle and physics behind the on-chip Bragg grating or other optical waveguide components used for the realization of the proposed optical gas sensor design. • Performance analyses of the suggested multi-layer plasmonic gas sensor in terms of drift modeling, confinement factor, sensitivity, figure of merit, and detection limit, etc. • Derive the mathematical expression for the dominant electric field components (quasi-TM or quasi TE), confinement factor, effective refractive index, and the relative sensitivity of the proposed nanophotonic sensor. • To study and propose some methods for enhancing the figure of merit, sensitivity and detection limit of the suggested gas sensor. • To develop the suggested multi-layer plasmonic gas sensor and validate the result with MATLAB.	Mandeep Singh (National Institute of Technology Karnataka Surathkal)	4415812.55	Not recommended Pertains to Ministry of Coal

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6	SNTMO M/7/2020	Study on plausible excavation methodology for recovery of minerals lying in the close proximity of the structures (Duration: 3 Yrs, 0 Mth)	• Development of lime-based non-explosive rock breaking compound for rock excavation using large diameter drilling. • Investigation on the extent of application of lime-based non-explosive rock breaking compound for rock breakage. • Prospects of reducing in-situ strength of the rock mass using cryogenic pre-treatment and thereby reducing the explosive charge for rock excavation. • Development of feasible excavation methodology for recovery of minerals lying in the proximity of the structures.	VIVEK KUMAR HIMANSHU (CSIR Central Institute of Mining and Fuel Research)	6537000.00	Recommended Interesting project for improving recovery from UG mines.
7	SNTMO M/8/2020	Development of Retractable Bed Cover and Dust Collector for Transport Vehicles in Mines (Duration: 2 Yrs, 6 Mth)	i. To develop a motorized retractable cover and dust collector for trucks/ tipplers/ dumpers ii. Field trial of the developed system in mines iii. Technology transfer and commercialization of the product	Swadeskumarch aulya (CSIR Central Institute of Mining and Fuel Research)	8075300.00	Not recommended Not thrust area of Ministry of Mines
8	SNTMO M/9/2020	Development of inner casing of aero-engine by fly ash coating via Plasma Spray technique (Duration: 3 Yrs, 0 Mth)	Primary objective of this proposal is to develop high temperature/harsh environment resistance fly ash coating on mild steel substrate for aero-engine inner casing via plasma spray technique. It will be achieved by the following sub-objectives/activities: (i) Physical characterization of atmospheric plasma spray coating of fly ash on mild steel substrate which includes surface topography analysis (splat formations), interface analysis and stable oxide phase identification (ii) Mechanical characterization of atmospheric plasma spray coating of fly ash on mild steel substrate such as micro hardness, adhesion strength, Young's modulus and porosity measurement (iii) Examining the sustainability of the coating in extreme corrosive environment via electrochemical corrosion test followed by surface and interface analysis of the corroded coatings. (iv) Analyzing the solid particle erosion wear resistance of coating in erosive/dusty/hot gas flow environment	Ram Sajeevan Maurya (Indian Institute of Technology Indore)	6901000.00	Not recommended Subject is not in the mandate of Ministry of Mines.

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9	SNTMO M/10/2020	Studying, modelling and evolving a new blasting technique for open cast mine excavations near the proximity of structures (beyond 50 m) using the structural response analysis and dynamic FEM (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Manifesting a methodology encompassing modelling and controlled blasting for extraction of minerals nearby structures. • To provide strong technical justification for open-cast mine blasting beyond 50 m from nearby structures. • To develop blast designs and technique for maximum possible extraction of abandoned minerals and coal beyond 50 m from nearby structures in open-cast mines without compromising safety of structures. • Adjudging the adequacy of conduit blasting technique for blasting nearby structure. • Studying and predicting the dynamic response of structures in the vicinity of blasting area using finite element tools and accordingly recommending the blast designs. 	Aditya Rana (CSIR Central Institute of Mining and Fuel Research)	3821076.00	Recommended Novel approach for blasting
10	SNTMO M/11/2020	Re-Engineering of Current Mineral Flotation System- Experimentation and Optimization via Degree of Surface Interaction and Machine Learning Techniques (Duration: 3 Yrs, 0 Mth)	Based on the scope of research, the main objective of this proposal is re-engineering of current mineral flotation system to contribute to the reduction of resource consumption and to reduce the environmental impact of the generated waste in the mining industry. For this, the specific objectives are: 1. improve the design of flotation systems via the include of coarse mineral particle flotation and its surface modification, 2. investigate the flotation behavior of mineral particles under the action of modified collectors, and their mechanisms for adsorption on its surface 3. interaction of the collectors by molecular simulation to increase the adsorption capacity on the mineral surface for achieving an enhanced flotation performance 4. study the effect of epistemic and stochastic uncertainty on flotation systems that include the particle flotation 5. re-design current flotation systems by machine learning techniques based on surface modification.	Subrata Kumar Majumder (Indian Institute of Technology Guwahati)	14632356.05	Not recommended Research is more of academic in nature and leads to fundamental understanding.
11	SNTMO M/12/2020	Development of dispersion and dilution model of DPM (Diesel particulate matter) concentration of underground metal mines and optimization of ventilation parameters to improve workplace safety (Duration: 3 Yrs, 0 Mth)	1. To conduct a base line study for DPM concentration of different workings in underground metal mines. 2. To study the dispersion and dilution behaviour of DPM using computational fluid dynamics (CFD) model. 3. Determination of optimum air quantity requirement to dilute different levels of DPM concentration in lab-scale model (low speed wind tunnel) and Mine Fire Model Gallery. 4. Study the efficacy of dilution by optimizing ventilation parameters to achieve better workplace environment and safety.	DEBASHISH MISHRA (CSIR Central Institute of Mining and Fuel Research)	4978300.00	Not recommended Issue of Ventilation is not a thrust area of MOM, pertains to DGMS, under Labour Ministry.

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12	SNTMO M/13/2020	Phase Field Approach for Fracking of Rocks (Duration: 3 Yrs, 0 Mth)	To develop a thermodynamically consistent framework for Fracking of rocks using phase-field approach. 1. To develop a nonlocal phase field model incorporating the definition of nonlocal damage. 2. To develop a numerical tool for hydraulic fracturing through a porous medium. 3. Simulate the numerical examples to demonstrate the capability of the proposed model	Amirtham Rajagopal (Indian Institute of Technology Hyderabad)	3484500.00	Not recommended Not a thrust area for MOM.
13	SNTMO M/14/2020	Recovery of copper from water bodies nearby copper mines using microbial electrochemical systems (Duration: 3 Yrs, 0 Mth)	i. To measure the physico-chemical properties including concentration of copper and other metals in the tailing pond water and waste water. ii. To design the economic microbial-electrochemical reactor for maximum metal recovery from mining waste water discharged. iii. To optimize the microbial community for selective reduction of the Cu, operating conditions and limiting factors for the copper reduction in the microbial-electrochemical system.	Vipin Kumar (Indian Institute of Technology ISM Dhanbad)	3599200.00	Recommended This project has pre-developed proof of concept
14	SNTMO M/15/2020	EVALUATING THE RARE EARTH ELEMENT POTENTIAL OF INDIAN COALS (Duration: 3 Yrs, 0 Mth)	1. To evaluate the REE potential of coal and coal by-products like fly-ash by measuring their total REE (including Y) concentrations using ICPMS. Samples from the following coal fields will be collected: Korba coalfield in Chhattisgarh, Jharia, Bokaro, and Giridih coalfields in Jharkhand, Ib river coalfield in Odisha, and Raniganj coalfield in West Bengal. We also plan to characterize the coal fly-ash from some steel and power plants in Odisha, Jharkhand, and West Bengal. 2. To determine the LREE/HREE ratio of Indian coals. 3. To characterize the nature of phases/minerals hosting the REEs in coal and coal by-products using detailed petrographic studies with SEM and EPMA.	Dewashish Upadhyay (Indian Institute of Technology Kharagpur)	5226100.00	Recommended The problem is well defined. Methodology of work well laid out and doable.
15	SNTMO M/16/2020	Ore recovery from left out pillars in underground metal mines using cemented backfill (Duration: 3 Yrs, 0 Mth)	The objective of the study is to develop a design guideline to recover ore from left-out pillars in underground metal mines with cemented backfill for different geomining conditions like shape and size of orebody, inclination of orebody, depth of cover and the conditions of surrounding rockmass. If the guidelines are framed to recover these locked-up ores, there will be an immense benefit to the country, in general, and the industries in particular. The objective is categorised into the following deliverables: i. Detailed stability analysis of existing pillars, review of global stability using 3D numerical modelling. ii. Determination of suitable property of fill material for different geomining conditions. iii. Devising a safe method of pillar extraction for a variety of underground mining scenarios. iv. Frame general guidelines.	Arka Jyoti Das (CSIR Central Institute of Mining and Fuel Research)	3212680.00	Recommended Mineral recovery increase from under ground mines.

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16	SNTMO M/17/2020	To develop AI based tool for optimisation of grinding circuits in mineral processing plants (Duration: 3 Yrs, 0 Mth)	1. To develop AI based computer program for grinding mill which can take input data, store them in files, estimate performance parameters, do required internal analysis and over a period of time help the plant operator in making required changes to optimize the equipment performance and minimise losses. 2. To develop AI based computer program for classifier which can take input data, store them in files, estimate performance parameters, do required internal analysis and over a period of time help the plant operator in making required changes to optimize the equipment performance and minimise losses. 3. To integrate the AI based program developed for grinding mill and classifiers to optimise overall grinding circuit performance. 4. To make the program capable of marking anomalous data and readings and over a period of time alert the plant operator about such deviations along with the possibility of breakdown or maintenance requirements	Pankaj Kumar Jain (Indian Institute of Technology ISM Dhanbad)	2484300.00	Recommended The potential outcome (AI based simulation program) can be beneficial to beneficiation plants using grinding-classification systems.
17	SNTMO M/18/2020	FABRICATION OF FULLY AUTOMATED REACTOR FOR THE EFFECTIVE REMOVAL OF HEXAVALENT CHROMIUM FROM INDUSTRIAL EFFLUENTS USING SURFACE MODIFIED NEYVELI LIGNITE (Duration: 3 Yrs, 0 Mth)	1. To convert hydrophobic Neyveli Lignite(NL) to Hydrophilic Lignite through depolymerization process. 2. The surface modified lignite(depolymerized Neyveli lignite (DPNL)) will be characterized by XPS, FTIR, SEM, Water contact angle study, AFM and Zeta potential values 3. The removal efficiency is going to be checked by using artificial pollutant. 4. To treat the pollutant in an automated working model with 5 L capacity, a prototype will be fabricated. 5. The detoxification efficiency of working model will be checked by analyzing the treated effluent in terms of the concentration of Cr(VI) through Inductively coupled plasma spectrometer(ICP). 6. To regenerate the exhausted DPNL by treating with 0.1 N HCl 7. To recover the Cr(VI) present in acid solution as Barium chromate by treating with Barium chloride. After purification, it can be used as a raw material for paint, Fire works industry, etc 8. A process patent will be filed after prior permission from MoM, New Delhi	SAKTHIVEL A (MSECSVKS)	1853670.00	Recommended Objectives well defined Covers thurst area of MoM

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18	SNTMO M/19/2020	Recycling and Sustainable Recovery of Critical Rare Earths from Electrical and Electronic Wastes (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> Systematically ascertain the potential and economic viability of recycling and recovery of the most critical RREs (Nd, Dy, Eu, Tb, Y) from the End-Of-Life Electrical and Electronic Wastes (EOL-EEW) due to significant supply chain risk and surging demands for sustainable clean technologies. Developing eco-friendly urban coming chemical routes for the recovery, separation, and isolation of REEs from EOL-EEW as highly enriched sources than existing ecologically unsustainable, energy-inefficient mining and separation of REEs. Design, synthesis, characterization of macrocyclic chelators, and ionic liquids for effective separation of REEs based on differential ionic sizes, binding affinities, and solubilities. The speciation thermodynamics and kinetics with extractants will be studied to fine-tune their structures. Efficient collection, recovery, and separation processes for REEs will be evaluated for economically viable urban mining with future potential of commercialization. 	Ashis Kumar Patra (Indian Institute of Technology Kanpur)	5348400.00	Not recommended Already project of this nature done by NFTDC sponsored by MoM
19	SNTMO M/20/2020	Experimental and Theoretical Investigation of Multiple Rigid Barriers for Resisting Debris Flows in Open-cast Mines (Duration: 3 Yrs, 0 Mth)	In open-cast mining, waste rock is stripped as the pit becomes deeper; therefore, this angle is a safety precaution to prevent and minimize damage and danger from rock falls. However, this depends on how weathered and eroded the rocks are, and the type of rocks involved. It also depends on the amount of structural weaknesses occur within the rocks, such as faults, shears, joints or foliations. Even after taking such precaution, debris flows may get initiated due to landslide, surface run-off, or seismic events and lead to tremendous damage to valuable equipment and machinery inside the pit. A commonly adopted approach for intercepting devastating debris flows is the construction of multiple rigid barriers along the slope. A large-scale field experiment is proposed to replicate the behaviour of rigid barriers. A robust generalized theoretical framework is also planned to be developed for capturing landslide and designing such multiple obstacles.	Priyanka Ghosh (Indian Institute of Technology Kanpur)	7654220.00	Not Recommended Project pertains to the safety, which comes under DGMS.
20	SNTMO M/21/2020	Internet of Things (IoT) based information extraction from manganese ore using optimization based image segmentation (Duration: 3 Yrs, 0 Mth)	An IoT based platform has to be developed for information extraction from the image of an ore from a mining site regarding the percentage of the ores present in the material. The server or cloud is to be established at the remote station. The server should be equipped with the algorithm on image segmentation (to be developed). After the image processing, the information regarding the percentage of composition of ores in the material will be sent to the client.	DUSHMANTA KUMAR DAS (National Institute of Technology Nagaland)	3341526.00	Not recommended. Project is academic/theoretical in nature

File No.Met4-14/3/2020-Metal IV

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21	SNTMO M/23/2020	Neutralization of Bauxite Residues and their Utilization for Mine Backfilling for Sustainable Development (Duration: 3 Yrs, 0 Mth)	1. Determination of toxic potential of BRs through a series of characterization studies 2. Laboratory studies on different neutralization techniques for establishing their potential, as an in-situ treatment method for BRs 3. Characterization of neutralized bauxite residues, NBRs to determine i) the efficacy of the technique and ii) its potential as a manmade resource 4. Exploring the feasibility of decontamination/neutralization of the backfilled area by purging different reactive fluids (acids/gases) 5. Establishing the short and long-term impacts of the mine closure operation with BR/NBRs 6. Establishing the guidelines for the execution of the mine backfilling operation in open cast mines followed by their neutralization 7. Detailed characterization of LFMSF and manmade soils 8. Establishment of the engineering properties and nutritional values of the manmade soils 9. Utilization of the manmade soils as a topsoil cover for closure of mine and vegetative layer	Devendra Narain Singh (Indian Institute of Technology Bombay)	28684900.00	Recommended Concept well defined Potential for bulk utilisation
22	SNTMO M/24/2020	Development of latest Material and Nano-Coating techniques for Investigating and Improving the Performance of Mining and Drilling Equipments to Resist the Failure due to Corrosion attack. (Duration: 3 Yrs, 0 Mth)	The aim of this project are as follows: • Investigation and analysis of failures occurring in mining and drilling equipment and propose the preventive maintenance solution to avoid breakdowns. • Aim to develop better nano-composite material for manufacturing of mining and drilling equipment. • Their prevention against corrosion, hydrogen-induced cracking to avoid catastrophic failures. • Develop preventive nano-coating techniques to enhance operational life equipments used in mining and drilling.	Manish Vishwakarma (Maulana Azad National Institute of Technology Bhopal)	12521500.00	Recommended Project envisages increase performance of mining & drilling equipments.
23	SNTMO M/25/2020	Development of low cost hand held Laser Induced Breakdown Spectroscopy tool for rapid and online scanning for mineral detection and elemental identification. (Duration: 2 Yrs, 8 Mth)	• To develop a novel low cost portable hand held Geo chemical analytical tool for mineral identification and elemental analysis for use in the mining industry. • To make the study and equipment environment friendly. • To obtain on-site, accurate and fast data. • To link the data acquisition to mobile or tablet. • To connect the results to a system using cloud. • To obtain multi element data. • To have a solar backup to power the equipment. • To address the challenges of miniaturization, cost and accuracy of data.	VISWANATH BELLIE (New Horizon Educational and Cultural Trust)	5713500.00	Recommended The problem is well defined. It addresses a critical need and requirement.

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24	SNTMO M/26/2020	Development of a process for the production of chromic oxide from chromite beneficiation plant tailing (Duration: 2 Yrs, 0 Mth)	Development of a process for the production of chromic oxide from chromite beneficiation plant tailing.	RANJEET KUMAR SINGH (CSIR National Metallurgical Laboratory)	5816000.00	Recommended Project aims at evaluating alternative process approach for obtaining a chromic oxide from low grade plant tailings after enrichment.
25	SNTMO M/27/2020	Synthesis of phospho, thio and oxo group containing ligands for efficient extraction and separation of rare earth elements (Duration: 3 Yrs, 0 Mth)	We propose to synthesize several ligands that contains phosphorous , sulphur or oxygen. the synthesized ligands are tested for the extraction efficiencies for rare earth elements in the rare earth minerals or waste from the nuclear power plant. we also focus on the separation of lanthanides and actinides using these ligands (chelating agents). Further, the ligands are synthesized in a large quantity for testing its application in an extraction process of transuranium elements in the nuclear wastes and rare earth minerals. We also propose the recovery of the rare earth elements from the electronic scrap using these ligands	AmshumaliMun galimane (Vijayanagara Sri Krishnadevaraya University)	2660000.00	Not recommended Novelty missing and application part is very generalised.
26	SNTMO M/28/2020	Cemented pastefill as artificial roof for underhand stoping - numerical and field study (Duration: 3 Yrs, 0 Mth)	1. To develop a suitable material model to represent pastefill material in numerical modelling 2. To obtain complete stress-strain curves in servo-controlled laboratory testing machine under tri-axial compression and design post-failure characteristics for numerical modelling 3. To assess the applicability in real mining scenario and develop norms for pastefill roof stability	Dr. John Loui Porathur (CSIR Central Institute of Mining and Fuel Research)	1696800.00	Not recommended Limited scope and already in use by HZL.
27	SNTMO M/29/2020	DEVELOPMENT OF A BIOPROCESS FOR CLAY PROCESSING INDUSTRY DISCHARGE RECYCLING (Duration: 3 Yrs, 0 Mth)	1. Development of a microbial system for removing Fe (2+) and other metal impurities from clay processing industry discharge, and optimizing its efficiency for application in an engineered biological system. 2. Design and development of a bioreactor for regenerating reuse quality water from the clay processing industry. 3. Validation of the microbial system, and the bioreactor for treatment/regeneration of real effluent from a clay processing industry. 4. Demonstration of the process to the industry partner for scale-up and field implementation.	KRISHNAKU MAR B (CSIR National Institute for Interdisciplinary Sciece and Technology)	5428000.00	Not recommended Project is not well defined Similar research has already been done. No novelty. Research is of academic interest.

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28	SNTMO M/30/2020	Enzyme Mediated Remediation of Precious Metals and Metalloids from Mine Wastes Employing Alkaline Phosphatase(s) For Products Recovery. (Duration: 3 Yrs, 0 Mth)	Objectives I. Microbial isolation and characterization from the mine sites and development of enzyme alkaline phosphatase(s) profiling of the individual for metal specific studies. II. Assessment of enzymatic activity of different class of alkaline phosphatase (s) and precipitation studies of heavy metals and metalloids under simulated conditions of mine wastes and tailings. III. Evaluation of alkaline phosphatase(s) mediated bioremediation of heavy metals and metalloids in a reactor to analyze kinetic and mechanistic behaviour of catalytic process for its scale up.	W. Richard Thilagaraj (SRM Institute of Science and Technology)	4759200.00	Not recommended The project is of academic research in nature. There are no details of particular mine waste/tailings identified for the research. There is no industry participation.
29	SNTMO M/31/2020	Fragment size distribution during rock blasting using fracture mechanics (Duration: 3 Yrs, 0 Mth)	The objective of this project is to experimentally understand the crack growth and fragmentation due to blasting. The following are to be studied via fracture mechanics: 1. Dependence of charge position (blast hole) on fragment size for a cracked rock 2. Dependence of charge load (via quasistatic hydrostatic pressure) on fragment size for a cracked rock The objective will be to be able to optimize the desired fragment sizes based on the above two parameters i.e. charge position and charge load.	Gaurav Singh (Indian Institute of Technology Delhi)	5308028.00	Not Recommended No Novelty, enough work on subject has already been done.
30	SNTMO M/32/2020	Methodology for Tailing Dam Risk Assessment through Dam Break analysis and Evacuation Management - A typical case study demonstration (Duration: 3 Yrs, 0 Mth)	• To develop a methodology for Tailing Dam Risk Assessment through Dam Break analysis and Evacuation Management by considering different Tailing Dam failures. • To carry out typical Risk Assessment through Dam Break analysis and Evacuation Management of selected Tailing Dam • Recommendations on the general guideline for Tailing Dam Risk Assessment through Dam Break analysis and Evacuation Management	Anbazhagan P (Indian Institute of Science Bengaluru)	10185022.00	Not Recommended This project does not meet the thrust areas of research in mines.

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31	SNTMO M/33/2020	INVESTIGATION FOR RECOVERY OF LOW GRADE FINES BY MODIFIERS IN FLOTATION-HYDROTOPES (Duration: 3 Yrs, 0 Mth)	? To achieve higher grades useful in industry ? To reduce pollution mainly water and ground ? Economic viability will be achieved ? Use of suitable activators namely hydrotropes to process low grade coal fines in flotation process.	Chaduvula Asha Immanuel Raju (Andhra University)	2628750.00	Not Recommended Research is more of academic in nature and leads to fundamental understanding of using hydrotropes as modifiers. Enough fundamental research on different modifiers already done by various researchers. is no industry participation
32	SNTMO M/34/2020	Development of Digitally Enabled Hydraulic Components for Mining Application (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Develop a digitally enabled hydraulic components using smart sensors • Collect critical data from the equipment across the process and provide them with insights about their functionality. • Develop a numerical mathematical model to predict the failure modes in hydraulic components • Demonstrate the predictive maintenance to address failure problems in hydraulic transportation using a conceptual pilot test rig. • Develop a graphical user interface (GUI) using MATLAB for the pilot test rig to demonstrate the digitization of the hydraulic component. 	YOGANANDH J (SNR SONS CHARITABLE TRUST)	5964250.00	Not Recommended Expected utility is not clear.
33	SNTMO M/35/2020	Development of integrated Geology-Geophysics-Geochemical technique for targeting G3 stage of sulphide mineral exploration in Betul Fold Belt, Central India (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • High Resolution-Electrical Resistivity and Induced Polarization Tomography mapping of sulphide bearing horizons in shallow subsurface through integrated Geological, Geophysical and Geochemical investigations. • Enumerate the mantle-melting process and crustal assimilation for the associated processes in the formation of Ni-Cu-PGE bearing sulphide minerals and volcanic hosted massive sulphide (VHMS) ores, and development of conceptual ore genetic models. 	DEWASHISH KUMAR (CSIR National Geophysical Research Institute)	9673000.00	Recommended The proof of concept is well defined. The methodology is well laid out and doable.

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34	SNTMO M/36/2020	Development and characterization of graded tungsten heavy alloy of W-Ni-Fe-Mo with oxide dispersion through spark plasma sintering (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Fabrication of tungsten heavy alloy of W-Ni-Fe-Mo with oxide dispersion of Y₂O₃ and La₂O₃ using spark plasma sintering technique. • Investigating the microstructural parameters of grain size, contiguity, matrix volume fraction and tungsten dissolution in the matrix phase. • Exploring the mechanical properties such as tensile strength and flexural strength, and studying the fracture behaviour through fractography analysis. 	N Senthilnathan (VELLORE INSTITUTE OF TECHNOLOGY)	1643250.00	Not Recommended Very general in nature No novelty
35	SNTMO M/37/2020	Use of microgravity, electrical resistivity tomography and global optimization techniques in delineating voids, cavities in and around Jharia coalfield of Dhanbad (Duration: 3 Yrs, 0 Mth)	(i) Delineation of the voids, cavity, waterlogs, barrier, fractures, galleries, etc. using microgravity anomalies and ERT, (ii) To develop the Graphical Unit Interface (GUI) file of the PSO GSA algorithm for the 2D modelling and inversion of microgravity anomalies and ERT to estimate the depth, shape, and size of the voids, cavity, waterlogs, etc. (iii) 3D modelling/inversion of the microgravity anomalies and ERT data using global optimization techniques such as PSO GSA of the study area.	Upendra Kumar Singh (Indian Institute of Technology ISM Dhanbad)	9621050.00	Not Recommended Not in the mandate of Ministry of Mines.
36	SNTMO M/38/2020	Experimental and Modeling Analysis of a Fluidized Bed Reactor in the reduction of hematite to magnetite to treat the low-grade iron ores for productivity improvement. (Duration: 3 Yrs, 0 Mth)	1. Reduction of low-grade Hematite to Magnetite by reductant gas carbon monoxide in fluidized bed reactors. 2. Obtaining operating and design parameters for selective extraction of converted Magnetite and recycling of unconverted Hematite along with reductant gases. 3. Complete modeling of reaction kinetics for reduction reaction with heat exchange, solid reaction, gaseous reaction modeling.	Rahul Kumar Soni (CSIR Institute of Minerals and Materials Technology)	7441000.00	Not Recommended Enough research work has already done on this area. Advanced equipments are available for beneficiating Hematite ores directly 3. No novelty in the project.
37	SNTMO M/39/2020	Studies on effect of blast-induced dynamic forces on slope stability of open pit mines (Duration: 3 Yrs, 0 Mth)	The objective of the study the stability analysis of jointed rock slope subjected to dynamic blasting force. The study will help the practicing engineers for safe and efficient stability of slope. The objective is categorized into the following deliverables: i. Prediction of blast vibration attenuation of rock slope. ii. A time-history analysis-based method for calculation of dynamic factor of safety of rock slope iii. Frame general guidelines for dynamic slope stability of open cast slope.	MORE RAMULU (CSIR Central Institute of Mining and Fuel Research)	4923576.00	Not Recommended Project pertains to safety, which in not mandate of MoM.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
38	SNTMO M/40/2020	Optimization of support system and left-out in-situ pillars during overhand cut-and-fill stoping operations in underground metal mines (Duration: 3 Yrs, 0 Mth)	To develop empirical design guidelines with aim to optimize support system requirement and left-out in-situ pillars during the overhand cut-and-fill stoping operation in underground metal mines without jeopardizing safety of the mining environment and people involved with. If the new design guidelines are framed with optimization of support system, then there will be an immense benefit to the country, in general, and the industries in particular.	Manoj NamdeoBagde (CSIR Central Institute of Mining and Fuel Research)	7925200.00	Recommended Project aims to improve the recovery of mineral in Underground mine.
39	SNTMO M/41/2020	An age-integrated mineral-melt mass balance accommodated phase equilibrium study to constrain dynamics of REE enrichment in S-type granite-pegmatite from N-W Bastar Craton, India (Duration: 3 Yrs, 0 Mth)	The main objectives of the proposed research areas outlined below: What are the major and trace element content of S-type granite-pegmatites present in the NW part of Bastar Craton? What are the major and accessory minerals present in S type- granite-pegmatite that can host a significant amount of REE, and in what condition they crystallize? What are the dynamics for REE mobilizations from solid crystals and coexisting melts in granite-pegmatite systems? What are the time scales of the geodynamic process for REE mobilizations from Archean/Proterozoic to generate S-type granite - pegmatite system?	PRITAM NASIPURI (Indian Institute of Science Education and Research Bhopal)	3636750.00	Not Recommended The problem and deliverables are not well defined.
40	SNTMO M/42/2020	Development of a new type high-efficient hydrocyclone for Indian iron ore slimes beneficiation. (Duration: 3 Yrs, 0 Mth)	The main objective of this study is to develop a new-type of hydrocyclone that can generate strong centrifugal force inside the hydrocyclone and reduce the influence of short-circuiting flows. Normally, the area between the vortex finder and the cylindrical wall acts to provide preliminary separation, but true separation occurs only in the conical section of the hydrocyclone. In our new-type of hydrocyclone the outer wall of the vortex finder is downwardly and outwardly tapered, and the upper part of the cyclone body is axially and inwardly tapered. The conical-shaped area between the vortex finder and the cyclone body decreases progressively from the top. This accelerates the helical flow and increases the centrifugal force inside the cyclone, causing the top section of the new-type hydrocyclone to be effectively used in particle separation. This strong centrifugal force is particularly beneficial for beneficiation of fine iron ore slimes.	SatyabrataMohanta (Indira Gandhi Institute of Technology)	2731500.00	Not Recommended Project pertains to Minsuirtry of Iron and steel.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
41	SNTMO M/43/2020	Extraction of metals and development of value-added product from Jarosite waste (Duration: 3 Yrs, 0 Mth)	• Extraction of valuable metals from jarosite. • Possible conversion of jarosite into value-added products (Coagulant, adsorbent etc) with minimal processing. • Solidifying stabilization of residue after metal extraction.	Madhu Agarwal (Malaviya National Institute of Technology Jaipur)	5270680.00	Not Recommended Not focused Clarity and novelty missing
42	SNTMO M/44/2020	Robust Intelligent models for predicting stochastic blasting outputs (Vibration, AoP, Flyrock Distance, Fragmentation) for mines in different host rock. (Duration: 2 Yrs, 0 Mth)	The study aims to complete following distinguish objectives. 1. Development of an extensive database of blasting results in different host rocks. 2. Development of Artificial Intelligence/Machine learning based model for prediction of various blasting output using the database developed. 3. Reliability analysis of developed model using advance statistical tools. 4. Development of framework of rational blast design based on developed intelligence-based prediction models. 5. Application of blast design in real field and monitoring the output.	SAURAV RUKHAIYAR (CSIR Central Institute of Mining and Fuel Research)	1835370.00	Not Recommended Lacks of novelty. Many projects on blast design already undertaken.
43	SNTMO M/45/2020	Design and development of a novel Eco friendly PV Solar based Mine Ventilation System (Duration: 3 Yrs, 0 Mth)	The source of dust and noxious gases in mines are equipment that runs on diesel engines, blasting with explosives, and the orebody itself. The largest component of the operating cost for mine ventilation is electricity to power the ventilation fans, which may account for one third of a typical underground mine's entire electrical power cost. Flow-through ventilation is the main ventilation circuit for the mine. Air enters the mine from surface via a shaft. The air is distributed through the mine via internal ventilation raises and ramps, and flows are controlled by regulators and permanently mounted ventilation fans. An auxiliary ventilation system takes air from the flow-through system and distributes it to the mine workings. PV Solar based (Green Power) underground mine ventilation provides a flow of air to the underground workings of a mine of sufficient volume to dilute and remove dust and noxious gases (typically NOx, SOx, Methane, and COx) and to regulate temperature.	PriyabrataAdhikary (New Horizon Educational and Cultural Trust)	1448500.00	Not Recommended Ventilation is not a thrust area for MOM. It pertains to DGMS under Ministry of Labour.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
44	SNTMO M/46/2020	Development of ML and AI models for optimum composition of cement-free fly ash based construction composites based on the physical and chemical properties of available fly ash (Duration: 3 Yrs, 0 Mth)	1. To source fly ashes from different locations in India and other countries and perform qualitative and quantitative chemical characterisations for all types of ashes. 2. To perform RnD operations to find optimum design of the construction composite for each type of ash 3. To statistically analyse the data and develop prediction models using AI and ML techniques. File for patents as applicable. 4. To make a mobile app based on statistical results for wide distribution and applicability	Tushar Gupta (National Institute of Technology Rourkela)	4920965.00	Not Recommended Not in the mandate of Ministry of Mines This project does not meet any of the thrust areas of research in mines. The project is related to fly ash based composite preparation.
45	SNTMO M/47/2020	Corrosion and wear resistant advanced coatings based on high entropy alloys for mining equipments. (Duration: 3 Yrs, 0 Mth)	Following will be the main objectives of the proposed research work: • To prepare a robust coating of AlCoCrFeNiTi _x (x=0, 0.5, 1 and 1.5) high entropy alloy with low porosity and excellent bonding strength by high-velocity-oxygen-fuel (HVOF) thermal spraying technique. • To investigate the microstructural behaviour of the AlCoCrFeNiTi _x (x=0, 0.5, 1 and 1.5) HEA coatings by optical microscope, scanning electron microscope, energy dispersive spectroscopy, XRD and AFM. • To investigate the wear behaviour AlCoCrFeNiTi _x (x=0, 0.5, 1 and 1.5) HEA coating by scratch and pin-on-disc tests. • To investigate the corrosion behaviour of AlCoCrFeNiTi _x (x=0, 0.5, 1 and 1.5) HEA coatings by immersion and potentiodynamic polarization tests. • Evaluation of wear and corrosion mechanisms associated with newly developed HEA alloy coatings.	Jayant Jain (Indian Institute of Technology Delhi)	2755200.00	Recommended Novel coating concept Mining equipment/ component to be identified
46	SNTMO M/48/2020	Development of multi-component high entropy alloys with significantly retarded degradation rate in corrosive mines environment (Duration: 3 Yrs, 0 Mth)	The following are the objectives of this project: • To investigate the degradation behaviour of some selected high entropy alloy (HEA) pellets subjected to corrosive mines environment. • To understand the mechanism of degradation of different HEAs with time of exposure using extensive microstructural characterization of materials. • To recommend the optimal alloy chemistry and microstructure which can maximise the reliability of materials in corrosive mines environment.	Chandan Srivastava (Indian Institute of Science Bengaluru)	5835532.00	Recommended Efforts made to increase the life of mine equipment in corrosive environment Mining equipment/ component to be identified

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
47	SNTMO M/49/2020	Identifying and Evaluating the Ecosystem multifunctionality and Services of Planted Forests on Coal Mine Spoil in a Dry Tropical Environment (Duration: 3 Yrs, 0 Mth)	-To identify the indicators/proxies of ecosystem multifunctionality and services under re-established forests on coal mine spoils. -To evaluate the ecosystem multifunctionality and services under re-established forests on coal mine spoils. -To develop maps for the distribution of ecosystem services under re-established forests on coal mine spoils. • To propose executable interventions for sustaining and maximizing the ecosystem services and multifunctionality under re-established forests on coal mine spoils. Questions -What are the different ecosystem services and functions provided by re-established forests on coal mine spoils? - What is the estimated monetary value of ecosystem services and multifunctionality provided by re-established forests on coal mine spoils? -Should we plant more exotic or native species to maximise the ecosystem services and functions for faster ecological recovery?	Anand Narain Singh (Panjab University)	7745654.00	Not Recommended Not mandate of Ministry of Mines.
48	SNTMO M/50/2020	Development of LiDAR-based real-time volume and weight measurement system for transported minerals (Duration: 2 Yrs, 6 Mth)	The manual accounting of the volume and weight of mineral being transported by trucks and trains can be inaccurate. At present, in most of the mines in India, there is no system for on-line measurement of production, dispatch, and stock. There is always an issue between mines and their customers for the quality and quantity of the minerals being dispatched. This may be due to the involvement of humans in various stages of loading, weighing, and dispatch. Therefore, avoidance of human intervention is strongly required to develop a transparent and unbiased system. To do so an automated online monitoring system for the measurement of volume and weight of minerals may be developed. OBJECTIVES: (i) To develop an real-time volume and weight measurement system (ii) Determination of size (lumps/fines) of minerals (iii) Determination of under-loading/over-loading of minerals in railway wagons (iv) Field trial of the developed system in a mine; and (v)Technology transfer and commercialization.	Jitendra Kumar Singh (CSIR Central Institute of Mining and Fuel Research)	27403550.00	Recommended Novel idea to assess the volume and weight measurement system for transported minerals

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
49	SNTMO M/51/2020	Geochemical Exploration of Uranium and its Potential Environmental Impacts in Garhwal Himalaya Region (Duration: 3 Yrs, 0 Mth)	The objectives of study are: 1. To perform simultaneous measurements of soil-gas/groundwater radon concentrations, radon exhalation rates and indoor/outdoor radon concentrations in grid pattern along Main Central Thrust in Garhwal Himalaya region for geochemical exploration of uranium and its potential environmental impacts. 2. To perform comprehensive study of the measurements of natural radionuclides in soil and uranium contents in groundwater/drinking water of the study area for radiation protection and risk management studies. 3. To locate the source of existing highradioactivity levels in the study area. 4. To pool the results (including some data available from past studies) and to investigate possible geographical/geological trends for natural radioactivity levels in study area and their physical causes. 5. To develop and validate empirical model for potential environmental impact of uranium and its associated radionuclides based on the acquired data.	Rakesh Chand Ramola (HNB Garhwal University)	22318810.00	Not Recommended Not mandate of Ministry of Mines.
50	SNTMO M/52/2020	Design, analysis and development of Rheo gravity die cast Al-15Mg2Si-4.5Si composite based light weight Bucket links for Mining Excavators (Duration: 3 Yrs, 0 Mth)	1. Design and development of the Rheo gravity die casting set-up. 2. Development of hypereutectic Al-15Mg2Si-4.5Si composite, with suitable alloying addition such as; Sr, B etc., following Rheo gravity die casting technique. Composite composition i.e, percentage of alloying addition will be optimised based on desired values of mechanical, tribological properties required for the development of "H link and side link" of mining excavator. 3. Development of comprehensive experimentally validated multiphase flow Computational Fluid Dynamics (CFD) based numerical models of (i) semi-solid slurry production, and (ii) solidification of the proposed composite. 4. Development of Constitutive model for the novel Al-Mg2Si-Si composite and Finite element analysis of deformation, fracture behaviour (macro and micro scale) of the developed composite under tensile and fatigue loading. 5. Design and development of prototype "H link and side links of mining excavator", out of the proposed MMC.	Prosenjit Das (CSIR Central Mechanical Engineering Research Institute)	7270950.00	Recommended Project is to improve the efficiency of excavators used in open cast mines. Indigenous concept Will support the idea of enhancing per capita aluminium consumption
51	SNTMO M/53/2020	Development of Multi Channel Ultra Short Chirped Fibre Bragg Grating (FBG) Based Quasi Distributed Sensor for monitoring of Hazardous Toxic Chemicals and Gases in an Underground Mines (Duration: 3 Yrs, 0 Mth)	The main objectives of the proposed research work are as follows I. Fabrication of FBG with a suitable Bragg wavelength at CGCRI-Kolkata and CSIO-Chandigarh laboratory. II. Coating of the FBG with the glassy polymer cellulose acetate. III. Immersion of this polymer-coated FBG in various chemical solutions to verify the mechanical strain on the glass fiber. A high-resolution tunable fiber ring laser interrogator is purposed to use for temperature reflectance spectrograms from the fiber gratings. The rapidly swept measurements of the full spectral shapes yield real-time chemical detection and identification. .Furthermore, we can integrate the proposed sensor with the Internet of things (IOT) for sending accurate data over iCloud, and at the receiver end we will able to get the data in our smart devices. More details are attached in Annexure-I.	SANJEEV KUMAR RAGHUWANS HI (Indian Institute of Technology ISM Dhanbad)	4150680.00	Not Recommended Pertains to ventilation, subject matter of DGMS under Ministry of Labour

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
52	SNTMO M/54/2020	Development of Process Flow Sheet for Recovery of High Pure Tin from Concentrate (Duration: 3 Yrs, 0 Mth)	In the present work an attempt will be made to recover tin from its concentrate cassiterite which is available in Chattisghar using hydro & electrometallurgy techniques. The method includes reduction roasting of the concentrate, leaching of the concentrate, purification of the leach solution and electro winning of the tin metal. The main objectives of the proposal are 1. To develop a process flow sheet to produce tin metal from its concentrate using , leaching, purification, electrowinning etc. 2. Testing the process in laboratory scale in 100 gms scale and bench scale at 1kg scale 3. Characterization of the low grade concentrate cassiterite end product tin metal. 4. Preparation of Techno Econmic Feasibility Report based on bench scale studies.	Mandapati Ramesh Naidu (VIGNANS FOUNDATION FOR SCIENCE TECHNOLOGY AND RESEARCH)	4860300.00	Not Recommended General in nature No Novelty Limited to process flow sheet development
53	SNTMO M/55/2020	Purification of Indian Magnesite Through Fusion Technique for Refractory Application (Duration: 3 Yrs, 0 Mth)	Magnesia containing refractory is crucial for steel and cement industries. Impure Indian magnesites are not used for making refractory for steel industry and are mostly imported (152.89 US\$ in 2018-19). Present attempt will be aimed at converting impure Indian magnesites to superior fused magnesia aggregate using combination of physical separation and/ or fusion processing. Initially, the impurities will be reduced through physical separation methods like froth flotation. This will be followed by fusion technique in presence of additives so that the pure magnesia phase can be separated from the impurities through gravity separation. The final product of the project would be purified large grain fused magnesia usable for the production of magnesia based composite refractory. Fused magnesia with bigger crystal size will impart the good corrosion resistance to the magnesite refractory. Process know-how will be developed to produce purer fused magnesia.	Himansu Sekhar Tripathi (CSIR Central Glass and Ceramic Research Institute)	7935174.00	Recommended Project envisages research in metallurgy & beneficiation to utilize lower grade ores and production of materials of high purity. This project is on development of product which has possibility of import substitution.
54	SNTMO M/56/2020	Test proposal submission (Duration: 3 Yrs, 0 Mth)	Test Objectives	Ponmozhi Jeyaraj (Indore Education and Services Society)	3873000.00	Not Recommended Not thrust area of MoM

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
55	SNTMO M/57/2020	Design and Fabrication of Fast Response Thermal Sensors for Transient Heat Flux Measurements during Blasting Operation for Coal Excavation (Duration: 3 Yrs, 0 Mth)	The objectives of the proposed work are as follows, (a) Design and fabrication of different types of heat transfer gauges (Thin film gauges and Coaxial thermocouples), (b) Laboratory based Blasting operation for Coal Excavation, and (c) Estimation of heat flux produced due to charges during blasting are the possible milestones of present investigations.	RAKESH KUMAR (Indian Institute of Technology ISM Dhanbad)	1394500.00	Not Recommended Pertains to Ministry of Coal
56	SNTMO M/58/2020	To determine using CFD the best combination of shares of grains of different sizes in multi-sized commercial slurries flowing through pipelines for minimum pressure drop (Duration: 3 Yrs, 0 Mth)	Objectives: 1. To select a suitable CFD model for simulating multi-sized slurries through horizontal pipelines following the due validation process using available experimental data. 2. To simulate a particular multi-sized slurry with combinations of shares of grains of different sizes flowing through a particular horizontal pipeline. 3. To repeat the work under Objective 2 for different types of slurries flowing through the same pipeline. 4. To extend the work under Objective 3 for different orientations of the pipeline. 5. To extend the work under Objectives 2, 3 & 4 for different sizes of pipelines. 6. To study the effect of combinations of shares of grains in multi-sized slurries on important slurry flow parameters. 7. To find out the best combination of shares for the minimum pressure drop of multi-sized commercial slurries flowing under different working conditions through pipelines of different sizes and orientations. (For details, see the attached document)	Manoj Kumar Gopaliya (SOCIETY RAMAN EDUCATION)	4755958.99	Not Recommended 1) This project does not meet any of the thrust areas of research in mines. 2) The project is related to CFD modelling of slurry flow in pipelines. 3) the project is of academic research in nature.
57	SNTMO M/61/2020	Imaging of manganese ores using state-of-the-art seismic methods - a pilot study (Duration: 3 Yrs, 0 Mth)	Seismic prospecting, particularly in delineating critical minerals, needs to be customized and established in the Indian context. Thus the objectives of this project are to carry out a pilot study conducting a joint 2D seismic interferometric, refraction and reflection survey in a manganese mine of MOIL to establish the application of these techniques in manganese mineral prospecting, but the same workflow can further be extended for any other kinds of mineral exploration in future. The major objectives are as follows: 1. To conduct a detailed seismic survey in one manganese mine of MOIL using state-of-the technologies like interferometry, reflection, and refraction methods. 2. Determine the extent of sub-surface mineral (here manganese) deposits for further proving of the deposit 3. Create a 3D lithologic map of the ore body up to a depth of 1000 m 4. Define modalities of the tests for future use and investigations	Dibakar Ghosal (Indian Institute of Technology Kanpur)	4500800.00	Not Recommended The objectives seem too generalized in nature.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
58	SNTMO M/62/2020	Laser Induced Breakdown Spectroscopy (LIBS)- A Versatile Geochemical Tool for Mineral Exploration (Duration: 3 Yrs, 0 Mth)	• This Project aims for a highly efficient qualitative and quantitative elemental analysis of mineral/rock samples using Laser-Induced Breakdown Spectroscopy (LIBS) technique. • Exploration of precious elements, e.g. gold in rock samples. LIBS shown unique capability to detect concentration down to ~1 ppm. In the case of gold, it is still worth extracting at such a low concentration. • Discrimination of various type of minerals and rocks based on its elemental composition.	ANOOP K K (Cochin University of Science and Technology)	15857140.00	Not Recommended The problem and the deliverables are not well defined.
59	SNTMO M/63/2020	Utilization of mine waste as aggregates in fly ash geopolymer concrete brick. (Duration: 3 Yrs, 0 Mth)	1. To identify the type of mine waste before mining through image processing by deep borehole core drilling. 2. To use mine waste as fine and coarse aggregates in the production of fly ash geopolymer concrete brick as a construction material. 3. To analyse the cost analysis and life cycle assessment of mine waste fly ash geopolymer concrete brick.	A Arun Kumar (VELLORE INSTITUTE OF TECHNOLOGY)	3068950.00	Not Recommended No novelty.
60	SNTMO M/64/2020	Development of a process for preparation of Cost effective Nanofluid using iron ore tailings from mines and its Characterization (Duration: 3 Yrs, 0 Mth)	1. To synthesize Fe ₂ O ₃ nanoparticles from iron ore tailings (Hematite, 50-150nm) with reasonable particles size distribution using the simplest preparative methods. 2. To study the effect of surfactants used on the dispersion stability particles size and morphology of the iron tailing for the preparation of the nanofluid. 3. To characterize the elements present in the nanoparticle used for the preparation of the Nanofluid. 4. To investigate the thermo physical Properties of the iron tailings of nanoparticles. 5. To conduct laboratory trials for evaluation of cooling efficiency of the fluid in heat engine.	Amar Kumar Das (Balam Panda Trust)	2617000.00	Not Recommended Pertains to Ministry of Iron & steel
61	SNTMO M/65/2020	Laser drilling of Non-metallic Rocks during Mining (Duration: 3 Yrs, 0 Mth)	Studying the influence of laser parameters on the drilling responses of non-metallic rocks in dry and saturated conditions 2. Investigating structure-property correlations in Laser drilled Rock samples and characterising the behaviour of rocks for mechanical and thermal performances before and after laser irradiation 3. Rock Laser Interaction Damage Assessment using Acoustic Emission (AE) Monitoring 4. Developing a numerical model considering phase transition process for surface failure features and validating the same with experimental laser conditions	Bharatish A (RashtreeyaSikhana Samithi Trust)	3266800.00	Not Recommended No novelty.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
62	SNTMO M/66/2020	Beneficiation of fine zinc mineral particles from sphalerite trailing in Zinc processing industry using ionic microbubbles (Duration: 3 Yrs, 0 Mth)	In the present scenario, substantial attention is uprising in acquiring new methods and in ameliorate old ones for the treatment of zinc trailing. The tailings of the zinc flotation stage may contain significant quantities of lead as well as interfering and gangue minerals (undesirable impurities) such as pyrites and silicates. Ionic microbubble flotation can be considered as one the best technique of separating fine suspended particles in trailing. This method utilizes ionic or charged micron-sized gas bubbles for separating opposite charged suspended particles. The objective of the proposed research is to develop a novel mineral beneficiation cell for recovery of fine zinc and other important mineral in zinc ore trailing. To save fine and ultrafine zinc particles in industries and therefore enhance the economy of mineral processing unit with Ionic microbubble flotation.	Rajeev Parmar (Maulana Azad National Institute of Technology Bhopal)	6392140.00	Not Recommended This project seems to be conceptualized based on available literature. Well established process being used by HZL
63	SNTMO M/67/2020	Definition of delay sequencing in blast designs using advance analytical techniques for optimization of blast fragmentation and improving mine economics in non-coal mines (Duration: 3 Yrs, 0 Mth)	1. Investigations in rock explosive interaction at different delay sequences using high speed data acquisition and pressure measurements. 2. Generation of significant database for analysis of combinations of delay sequences in blasting and fragmentation assessment. 3. Analysis of data using deep learning methods and response surface analysis 4. Models for delay sequencing and fragmentation distributions 5. Development of guidelines and application for industrial use - Make in India	AUTAR KRISHEN RAINA (CSIR Central Institute of Mining and Fuel Research)	5145000.00	Recommended Project is to optimize blast fragmentation to increase the economy of mine.
64	SNTMO M/68/2020	Geochemistry of Groundwater, Soil and Bioaccumulation of Heavy Metals in Biota near Manganese Mining areas of North Coastal Andhra with a Special reference to Public Health (Duration: 3 Yrs, 0 Mth)	1. To identify the mining areas with GPS coordinates 2. To Characterize Ground Waters and Soils for Physicochemical parameters to assess the Chemical contamination and to investigate the levels of heavy metals in Ground waters, soils and assessment of bioaccumulation of heavy metals in Biota (plants like vegetables, leafy vegetables, rice and fish) near Mining areas. 3. To geo tag the analytical data by Remote Sensing technique using GIS and geochemical analysis by Piper Diagrams, Chadah Diagrams etc., and to conduct people's health survey and statistical analysis to the all generated data. 4. To identify hyper accumulator plants used for phytoremediation of heavy metal contaminated sites. 5. Mapping of vulnerable areas With respect to Ground Water & Soil) due to Mn Mining polluted sites in Vizianagaram and Srikakulam Districts 6. To extract heavy metals from ground waters and soils for preparing Nano metal particles and to employ them for wastewater treatment	PALAGUMMI VENKATA SATYA MACHIRAJU (GAYATRI EDUCATIONAL SOCIE)	4842390.00	Not Recommended This project does not meet any of the thrust areas of research in mines. Project is related to geochemistry of ground water, soil etc. No novelty

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
65	SNTMO M/69/2020	Fabrication of Magnesium Syntactic Composite Foam by Using Ultrasonic Assisted Casting Technique (Duration: 3 Yrs, 0 Mth)	a) To fabricate magnesium fly ash cenosphere syntactic composite foam by using ultrasonic assisted casting technique. b) To achieve the uniform dispersion of fly ash cenosphere in magnesium matrix by ultrasonic assisted casting technique c) To identify the optimum weight percentage reinforcement of cenosphere in magnesium matrix to enhance the mechanical properties such as impact strength, compressive strength and damping behavior. d) Mechanical characterization of magnesium cenosphere syntactic composite foam and compare the existing composite foams.	SASIKUMAR RATHINASAB APATHY (V.Ponnusamy Educational and Charitable Trust)	2930508.00	Not Recommended No novelty. Ultrasonic assisted casting is an old technique and application also not defined
66	SNTMO M/70/2020	Investigation on the development Al-Al Cladding Material through Compound Casting Process-Experiments and Numerical Simulations (Duration: 3 Yrs, 0 Mth)	1. Development of clad AA3003/AA4045 compound casting slab experimentally. 2. Investigation and control of thermal profile at the clad interface through modeling and simulation (finite element analysis (FEA)). 3. Rolling of compound casting slab to develop cladding sheet 4. Establishing mechanical properties and microstructure correlation at the clad interface	Ramesh Kumar Nayak (Maulana Azad National Institute of Technology Bhopal)	5258850.00	Recommended Indigenisation of the process An attempt will enhance Al consumption in country
67	SNTMO M/71/2020	Structural Health Monitoring of Mines Using Artificial Intelligence Based Fiber Optic Sensor Network (Duration: 3 Yrs, 0 Mth)	1. To observe structural health of mines using fiber optic sensor network. 2. By implementing fiber optic sensor network in a particular region of the selected mine, microseismic waves will be detected and further utilised for structural health monitoring. 3. To utilise Fiber Bragg Gratings (FBG) based fiber optic accelerometer for microseismic wave detection and collect data from deep underground mines. 4. To find the origin of seismic wave generation and stress on underground tunnels through average velocity and time delay estimation techniques. 5. After successful data collection, average wave velocity calculation and time delay estimation from every sensing point, stress detection technique will be applied for structural health monitoring: 6. To use artificial intelligence based machine learning for noise suppression and accurate data interpretation.	AMITESH KUMAR (Indian Institute of Technology ISM Dhanbad)	2628950.00	Not Recommended Pertains to Safety of Mines, which comes under DGMS

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
68	SNTMO M/72/2020	Preparation of Barium Titanate Suitable for Electronic Industry from Unutilized Waste Barites of Andhra Pradesh (Duration: 3 Yrs, 0 Mth)	1. To prepare barium titanate from unutilized waste barites obtained from Kadapa region of Andhra Pradesh. 2. Characterization of barium titanate produced by measuring the physico-chemical properties. 3. Testing the material for its suitability by electronic industry.	P. Ashok Kumar (VIGNANS FOUNDATION FOR SCIENCE TECHNOLOGY AND RESEARCH)	4951000.00	Recommended This project has pre-developed proof of concept. Focused project on waste utilisation
69	SNTMO M/73/2020	Development of Empirical Methodology for Design of Crown Pillar during transition from opencast to underground mining for Indian Mines (Duration: 3 Yrs, 0 Mth)	a) to understand the influence of various design parameters on crown pillar stability through numerical modelling b) to analyse crown pillar behaviour under different geomining condition and to understand the failure mechanism of such pillar through physical modelling c) to optimise the amount of ore being locked up in crown pillar and d) to develop an optimum design methodology for crown pillar design under different geomining condition.	Chandrani Prasad Verma (CSIR Central Institute of Mining and Fuel Research)	3789850.00	Recommended Project envisages improvement in the recovery of minerals from underground mine.
70	SNTMO M/74/2020	Dynamic strength estimation of Indian coal (Duration: 3 Yrs, 0 Mth)	(i) To develop understanding of dynamic behaviour of coal. (ii) Testing and determination of dynamic strength and physico-mechanical properties of coal. (iii) To develop a high-speed photography technique to visualize the cracks opening and propagation during dynamic failure. (iv) To understand the impact of coal lithotype and macro-structures on their strength properties.	Ashok Kumar (CSIR Central Institute of Mining and Fuel Research)	14533000.00	Not Recommended Not mandate of Ministry of Mines.
71	SNTMO M/75/2020	A novel synthesis of rare earth mineral substituted hydroxyapatite from limestone mines-A bioinspired bone cement for biomedical applications (Duration: 3 Yrs, 0 Mth)	-To synthesize rare earth mineral hydroxyapatite bone cement using limestone obtained from Salem region in a south Indian state, as a source of calcium by ultrasonic coupled template assisted method. -The multimineral like Terbium (Tb), Samarium (Sm), Erbium (Er), Gadolinium (Gd), is to be substituted in Calcium during the synthesis of bioactive bone cement material. -The substitution of minerals is to be performed to enhance the biological property of HAP, so that it can be utilized in various biomedical applications like bone and dental fillers and also as coating material for the metallic implants in the orthopedic applications. -Bench scale fabrication of the bone mimic bioactive bone cement is to be characterized for its structural, morphological mechanical and biological properties. -To develop a feasible interaction with the limestone industry for the scaling up of the proposed novel material after successive clinical trials for various biomedical applications.	D. Gopi (Periyar University)	4905150.00	Not Recommended Not focused Objectives vague and not clear.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
72	SNTMO M/76/2020	AIRFLOW SEPARATION, AND ONLINE COAL SURFACE MOISTURE AND PARTICLE SIZE MEASUREMENT FOR IMPROVED POWER GENERATION (Duration: 2 Yrs, 0 Mth)	1. To establish a relationship between coal particle size, coal moisture, humidity (RH), and ambient temperature (RT) with line pressure on coal throw pattern 2. Online measurement of surface moisture of coal 3. Simulation, and re-design the aerial coal separation and injection system. 4. Online auto control between line pressure with coal variation in size, shape and moisture. 5. Minimization of pressure fluctuation caused by the coal injection system due to particle size and moisture. 6. To find out minimum conveying velocity to avoid saltation in case of coal as well as the mixture of coal and coal char breeze and coal (coke breeze is the by-product of sintering plant). 7. Correlate results with plant practices and develop optimization schemes for the reduction in coal consumption	Venugopal Arumuru (Indian Institute of Technology Bhubaneswar)	3746200.00	Not Recommended Pertains to Minsitry of coal
73	SNTMO M/77/2020	Development of Graphite, Graphene oxide, reduced Graphene oxide from Biomass- An Alternative Resource Generation for Natural Graphite (Duration: 3 Yrs, 0 Mth)	• To produce graphite from biomass by thermal treatment with organic additives • Comparison of biomass-derived graphite with natural graphite available in India by using different characterization techniques • Feasibility study to scale up the process to make graphite from biomass • To convert biomass-derived graphite into graphene oxide (GO) and reduced graphene oxide (rGO) to improve the economic value.	R SAKTHIVEL (CSIR Institute of Minerals and Materials Technology)	8228076.00	Not Recommended This project does not meet any of the thrust areas of research in mines.
74	SNTMO M/78/2020	A PILOT SCALE DEMONSTRATION FOR RECOVERY OF TIN METALS FROM TIN DROSS REJECTS BY ELECTROWINNING AND ELECTROREFINING PROCESSES (Duration: 3 Yrs, 0 Mth)	? Design of experiments for confirmatory trials in laboratory/bench trials ? Design and develop laboratory pilot plant model for demonstration ? Operate the pilot plant and generate scalable data. ? Fixing quality control and standardize operating parameters ? Demonstrate the pilot plant to industries and get feedback ? Data compilation and prepared feasibility report for commercial production ? Submit final report and recommendation for commercial production in the country	RojalinSahu (kalinga institute of industrial technology)	8116252.00	Not Recommended Not focused No clarity among title and obejctives Vague objectives
75	SNTMO M/79/2020	Recovery of Silica from Bauxite Tailings and Utilization in Spark Plasma Sintering Process for the Fabrication of SiC-Si3N4 Ceramic Composite (Duration: 3 Yrs, 0 Mth)	• Recovery of silica from bauxite tailings using wet chemical method. • Carbothermic reduction of recovered silica and graphite mixture with nitridation to produce SiC/Si3N4 ceramic composite powder with varying percentage of SiC and Si3N4. • Fabrication of SiC/Si3N4 ceramic composite parts by spark plasma sintering method.	S.M.Ganesan (CSIR Central Electrochemical Research Institute)	3076920.00	Not Recommended Not focused No clarity among title and obejctives Vague objectives

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
76	SNTMO M/80/2020	Assessment on the impact of the coal mine waste on the geoenvironment and its remediation (Duration: 3 Yrs, 0 Mth)	The main objective of this study will be to investigate the impact of coal mining waste on the geoenvironment and providing a sustainable solution to minimize it.	Anil Kumar Mishra (Indian Institute of Technology Guwahati)	3886680.00	Not Recommended Not mandate of Ministry of Mines.
77	SNTMO M/81/2020	Design guidelines for the safe extraction of orebody by Underhand Long Hole Open Stoping (ULHOS) with paste filling method (Duration: 3 Yrs, 0 Mth)	This research aims to develop the design guidelines for the safe extraction of orebody by Underhand Long Hole Open Stoping (ULHOS) with paste filling method. The research activities cover the following parts of the design guidelines: (i) Determination of safe stope dimensions for different geomining conditions, (ii) Design of optimal stoping sequence to minimise the strata/ground control problems, (iii) Assessment of suitable strength of paste material for different geomining parameters, and (iv) Design of optimum crown pillars and sill pillars under varying geomining conditions.	RANJAN KUMAR (CSIR Central Institute of Mining and Fuel Research)	2964680.00	Recommended Project envisages to increase the recovery of minerals from UG Mines. .
78	SNTMO M/82/2020	Development and investigations of new chemical compositions to control the dust emission during blasting operation (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Development of chemical compositions for the suppression of the dust generated during the blasting operations. • Investigations of the surface properties of the developed compositions. • Investigation of the effect of the prepared compositions with the explosive used in blasting operation. • Investigation of dust suppressing ability of the developed chemical compositions during blasting operations. • Computational studies to analyze the effect of the chemical composition on the blasting outputs. • Development of eco-friendly chemical compositions for the minimal dust emission during blasting operation. 	Firoj Ali (CSIR Central Institute of Mining and Fuel Research)	5017200.00	Not Recommended Not thrust area of MoM
79	SNTMO M/83/2020	Development of prototype transferred arc plasma system for recovery of Fe and Cr metals from the landfills of toxic chromium bearing waste (Duration: 3 Yrs, 0 Mth)	1. To design and construct a prototype transferred arc plasma furnace for the recovery of Fe and Cr metals from the landfilled toxic Cr bearing waste, 2.To develop the plasma assisted aluminothermic process for a prototype system to recover Fe and Cr metals with non-toxic by products from the landfilled toxic Cr bearing waste, 3.To study the effects of process parameters on the recovery of metals and optimize the process parameters for better process efficiency, 4.To identify chemical species formed during the plasma assisted aluminothermic reaction and predict reaction mechanism, 5.To monitor and control the exhaust gas to run the plant within the prescribed emission norms.	KANDASAMY RAMACHANDRAN (Bharathiar University)	7691100.00	Not Recommended Enough work has been done in this area

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
80	SNTMO M/84/2020	Development of sustainable alternatives to conventional building products using Mine Tailing waste from Kudremukh (Duration: 3 Yrs, 0 Mth)	i) Characterization of the selected mining tail wastes-evaluation of physical, chemical and mechanical properties. ii) Utilization of the processed waste consisting of mine tails with basalt fiber and Wollastonite powder for construction purposes and building products. iii) Correlation of physical properties of mine waste with mechanical properties of concrete to predict compressive strength	RAVINDRA R (RashtreeyaSikshana Samithi Trust)	1888400.00	Not Recommended Project is general in nature No novelty.
81	SNTMO M/85/2020	Improving the performance of Malanjkhand copper concentrator under Hindustan Copper limited through modelling and simulation analysis. (Duration: 2 Yrs, 0 Mth)	I) Development of simulated model for the Malanjkhand Copper beneficiation circuit. II)Identify the bottlenecks in the existing beneficiation circuit. III) Simulation analysis and predicting the optimum parameters to improve the plant performance with following targets. a) Throughput/capacity increase > 15% b) Copper (Cu) recovery > 92 % c) Concentrate grade (% Cu) > 27% d) Reduction in reagent consumption, specific power consumption and specific water consumption.	Ajit Kumar Swain (CSIR National Metallurgical Laboratory)	7205000.00	Recommended Potential outcome benefits for the user industry
82	SNTMO M/86/2020	Effect of ceria on mechanical properties and tribological behavior of Mg and Al based composites (Duration: 3 Yrs, 0 Mth)	• Developing varying concentrations of ceria containing Mg and Al based metal matrix composites by ex situ method. • Microstructural characterization to capture the shape, size and distribution of reinforcements in the matrix. • Evaluation of mechanical property from room temperature to high temperature (400C). • Evaluation of tribological properties of the composites from room temperature to high temperature (400C).	Rama Krushna Sabat (Indian Institute of Technology Bhubaneswar)	3839288.00	Not Recommended General in nature. Vague in nature No clarity
83	SNTMO M/87/2020	Enrich the Quality of Indian Kaolin from the Gujarat and Karnataka States Mineral deposits for Market Potential Multifunctional Products (Duration: 2 Yrs, 0 Mth)	1.Geo-Mineral studies of the raw kaolin available in Gujarat and Karnataka States and explore high value by-products mica and rare earths. 2.Bleaching of raw kaolin available in Gujarat and Karnataka States using Eco-friendly Bleaching agent, thio-urea dioxide and enrich multi functional properties for fast emerging applications like inks, cool-pigments, microbial resistant coatings etc., 3.Processing of High-bright, IR Reflective Kaolin by Gradient coatings with enhanced brightness as high 87% and yellowness 5-6 and IR reflectance close to standard TiO2 for higher market price 4. Develop microbial resistant kaolin clays by functionalized with CeO2 nanostructures and develop eco friendly food packaging materials like Papers/sheets and coatings as alternate to polymer packaging 5. Develop rheology controlled kaolin formulations for 3D printing and produce honey-comb structures for the adsorption of automobile exhaust emission gases.	S. ANANTHAKUMAR (CSIR National Institute for Interdisciplinary Science and Technology)	5672560.00	Not Recommended Similar projects are underway sponsored by state government

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
84	SNTMO M/88/2020	Development of an Environmental Monitoring System for Underground Mines using Sensor-enabled Internet of Things (Duration: 3 Yrs, 0 Mth)	1. Development of an environmental monitoring system for the underground mines which can effectively measure the real-time status of hazardous gas emission, temperature, humidity, air pressure and dust generation. 2. Development of a miner and equipment tracking system which keeps records of the respective location of miner and equipment in order to facilitate the miners with precise surrounding status as well as to convey the emergency guidelines. 3. Development of an alarming system intimating the miners in case of emergency due to either unsafe environmental conditions or unsafe mining practices. 4. Development of an emergency evacuation guiding system which can lead the miners to leave the place safely in case of some mishaps.	ARINDAM BISWAS (Kazi Nazrul University)	2408800.00	Not Recommended Similar projects have been approved by MoM earlier without much success
85	SNTMO M/89/2020	Harnessing Helium and Argon from Indian hot springs (Duration: 3 Yrs, 0 Mth)	Describe in Page 17 : Part I - Section C in the Attachment	HIROK CHAUDHURI (National Institute of Technology Durgapur)	122073400.00	Not Recommended Not the mandate of Ministry of Mines.
86	SNTMO M/90/2020	Determination of optimum safe distance of toe of dump from crest of openpit for stability of pit slope under different geo-mining conditions (Duration: 3 Yrs, 0 Mth)	i. i. To study the effect of effect of different benching configurations, like bench height, bench width, overall height of dump, overall depth of pit, overall slope angle of pit, overall slope angle of dump, angle of repose, cohesion, angle of friction, lithology, structural discontinuities, presence of weakness planes etc. on the factor of safety of pit slopes and dump slopes ii. To determine the effect of distance of toe of overburden dumps from the crest of the openpit on the slope stability of pits and dumps under different geo-mining conditions iii. To find out optimum safe distance of toe of overburden dump from the crest of the openpit on the slope stability of pit under different geo-mining conditions	Sanjay Kumar Roy (CSIR Central Institute of Mining and Fuel Research)	8703560.00	Recommended Project has potential to maintain slope stability in Open Cast Mine.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
87	SNTMO M/91/2020	Development of Ready-To-Use Assorted Sand for Construction Activities from Zinc Refining Wastes and Marble Powder (Duration: 2 Yrs, 6 Mth)	This project aims to evaluate the engineering properties of artificial construction sand developed under the project entitled “Development of Ready-To-Use Assorted Sand for Construction Activities from Zinc Refining Wastes and Marble Powder” vide sanction order Met4-14/16/2018 – Metal IV/ Record Cell dated 28.09.2018. PI was given funds for one year for demonstrating proof of concept. PI has successfully developed artificial sand and a patent application no. 202011035875 has been filed. Therefore, following objectives are proposed under the present proposal: I. To use Jarosite for preparing artificial sand with waste marble powder. II. To evaluate the engineering and durability properties of concrete prepared using ready-to-use assorted sand in comparison with control mixes. III. To study the environmental suitability and microstructural properties of concrete prepared by using ready-to-use assorted sand in comparison with control mixes.	Bhavna Tripathi (MANIPAL UNIVERSITY JAIPUR)	5066585.50	Recommended The PI has already demonstrated proof of concept based on which a patent application has been filed. The project may be allowed to be taken up further. It is also recommended that the Project SNTMOM/235/2020 being similar in nature with a different design mix for evaluating the engineering properties of the construction sand may be taken with this project only. The PI may consider clubbing both projects.
88	SNTMO M/92/2020	Experimental and Numerical Simulation Techniques for Slope Stability Analysis and effective monitoring of Mine Waste Dump (Duration: 3 Yrs, 0 Mth)	i) To demonstrates the stress, displacement, plastic zone distribution, the possible failure mode and physic-mechanical parameters of the mine waste dump by conducting the insitu and laboratory investigation ii) To establish numerical simulation models for effective approach in real slope engineering applications using the strength reduction factor iii) To demonstrate and test the reliability of the fiber optic monitoring solutions to improve continuous monitoring techniques of dump sliding and deformation under different working conditions	Bikash Kumar Ram (Balam Panda Trust)	3308150.00	Not Recommended Similar type of projects approved earlier by S&T.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
89	SNTMO M/93/2020	Genetic Diversity of BIF hosted High-grade Iron Ores from the Bailadila Deposits Implications for Future Game Changing Exploration (Duration: 3 Yrs, 0 Mth)	1. To examine the variation in modes of occurrences for different orebodies in a major deposit 2. To understand the enrichment processes in course of transformation from BIF to iron ore. 3. To understand controls on textural and compositional variation of ore types 4. To determine stages and ages of mineralization if datable minerals are associated with ore forming processes. 5. To suggest suitable model for exploration and quality control based on ore genesis model. 6. To test the idea of 'ore beneath ore' with implications for hidden orebodies and augmenting the life and reserve of the deposit.	JoydipMukhopadhyay (Presidency University Kolkata)	6789118.00	Not Recommended Proeject pertains to Ministry of steel
90	SNTMO M/94/2020	Development of cement-free concrete from the extraction of value-added products from mine waste (Duration: 3 Yrs, 0 Mth)	Broad objective: • To find an optimum utilization percentage for red mud, fly ash and ground granulated blast slag in the production of geopolymer concrete along with sintered fly ash lightweight aggregate for replacement of conventional aggregate. Specific objectives: • To develop an environmentally friendly geopolymer concrete and arrive at an optimal mix proportion between red mud, class F fly ash, and GGBS, which can act as a binder in a geopolymer binder. • To develop an alkali activator by mixing suitable proportions of water, sodium hydroxide, and sodium silicate solution, which will remove the need of curing the geopolymer binder at elevated temperatures. • To critically evaluate the extent of usage of sintered fly ash aggregate in place of coarse aggregate in producing geopolymer concrete. • To test and validate the physical, mechanical, and durability properties for the developed binder and geopolymer concrete	DinakarPasla (Indian Institute of Technology Bhubaneswar)	4915502.00	Not Recommended This project does not directly meet any of the thrust areas of research in mines.
91	SNTMO M/95/2020	Red mud and waste collagen filled multipurpose hybrid polymeric materials for sensitive detection and removal of metal ions from mine tailings water and manufacturing tiles (Duration: 3 Yrs, 0 Mth)	1. To utilize major metallic oxide components of red mud (RM), leather buffing dust (LBD), and suitably functionalized polymers for producing stable materials capable as high-performance recyclable adsorbents for repeated removals of heavy metal ions from waste water emanating from mining industries. 2. To apply RM, LBD, and suitably functionalized rubbers for producing high-performance tiles. 3. To design and prepare intrinsically fluorescent polymeric materials capable of selective and specific sensing of heavy metal ion(s) in the waste water emanating from mining industries. 4. To monitor, detect, and exclude heavy metal contaminants and dyes from industrial waste water.	NAYAN RANJAN SINGHA (Government College of Engineering and Leather Technology Kolkata)	3728778.00	Not Recommended This project does not meet the thrust area of MoM.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
92	SNTMO M/96/2020	Next Generation Programmable Swarm Micro Robots and AI Enhanced Rational Decision Support Systems for Mining Automation (Duration: 3 Yrs, 0 Mth)	•To identify the different minerals of Lithium, Cobalt, Gold, Nickel, Manganese, Copper, Silver, Aluminium and Magnesium in real time data collection using the Programmable Swarm Micro Robots (PSMR) •To extract the features of rock face inspection, surface, temperature, gases, ore colour, humidity with the help of Improved Particle Swarm Optimization (IPSO) algorithm. •To collect the features from the programmable swarm robots a correct decision making algorithm is used. Improved Principal Component Analysis (IPCA) is used to minimize the redundant data retrieved from the programmable swarm robots. This will increase the processing speed and a quick decision gives better results to the Government as well as the mining owners.	SenthamilSelvi Marudavelu (SNR SONS CHARITABLE TRUST)	1783681.21	Not Recommended Objectives not defined Clarity missing
93	SNTMO M/97/2020	Development of Hybrid Energy Materials Using Industrial Wastes for Enhanced Energy Storage Devices (Duration: 3 Yrs, 0 Mth)	The current proposal goal to design and develop active electrode materials of modified mine and plant wastes for efficient energy storage performance. The main objectives are: 1) Control synthesis of oxides and zeolites using industrial/mine wastes for pseudocapacitors. 2) Control synthesis of porous carbon material using biomass or plant wastes for EDLC supercapacitors. 3) All Solid state device fabrication for symmetric and asymmetric supercapacitor. 4) The stable (>10000 cycles) based device with energy density at least 300 Wh/kg at 1 A/g current density This proposal is a step forward to develop mine and plant waste based supercapacitor device to meet the expected future energy demand and reduction of environmental pollution.	Arpan Kumar Nayak (Vellore Institute of Technology-Technology Business Incubator (VITTTBI))	5330083.00	Not Recommended This project does not meet any of the thrust areas of research in mines No Novelty.
94	SNTMO M/98/2020	Impact assessment of Whole-Body Vibration and Ergonomic Design of operator seat in Dump trucks for enhanced Production Efficiency and Safety (Duration: 3 Yrs, 0 Mth)	The objectives of the Proposed work are : 1. To perform on-field measurement of the Whole-body Vibration (WBV) levels of operators while operating the Dumper trucks under varying loads, speed and road conditions as per ISO 2631-1 and ISO 2631-5 standards. 2. To develop an ergonomic design of posture/seating arrangements by considering various parameters such as Anthropometric Parameters, Seat Suspension, Cab Layout, Angle of Seat and Back rest. 3. To develop a vehicle seat isolation system to isolate the harmful vibrations during the operation of the dumper. 4. To study the performance of the developed seat with respect to vibration isolation and ergonomics on the various excitations which occur during field operations.	L.A.Kumaraswamidhas (Indian Institute of Technology ISM Dhanbad)	7316700.00	Not Recommended Not mandate of Ministry of Mines

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
95	SNTMO M/99/2020	Biorecovery of Mg, Fe and Mn as growth endorsing plant minerals from magnesite mine soil through redox and adsorption process (Duration: 3 Yrs, 0 Mth)	? To screen potential microbes capable of Mg, Fe and Mn resistance using agar media enriched with respective elements ? To find out effect of carbon & nitrogen sources, temperature and pH on the mineralization of Mg, Fe and Mn from synthetic oxide ? To study the mineralization of Mg, Fe and Mn from synthetic metal oxide through a column study ? To study mineralization of Mg, Fe and Mn from magnesite mine soil by integrating potential microbes through a column and field study ? Extraction of Mg, Fe and Mn minerals by appropriate method ? Incorporation of Mg, Fe and Mn minerals with carrier materials ? To study the application of Mg, Fe and Mn minerals on plant growth and its root molecules	P.M. AYYASAMY (Periyar University)	4123150.00	Not Recommended The research area is more of soil remediation than recovery of metals for metallurgical industry.
96	SNTMO M/100/2020	Energy reform in mining area by small modular reactors and Renewable energy sources with AC micro grid (Duration: 3 Yrs, 0 Mth)	1. To reform the conventional energy system in Indian mines area (which needs huge amount of electrical power) by implementing cheaper, secure, cleaner & efficient energy. 2. To develop best quality power generated from DG sources like solar & wind. 3. Proper storage of renewable energy sources in battery through power electronics devices	SIBANANDA MISHRA (Balaram Panda Trust)	4423450.00	Not Recommended Not thrust area of MoM No major benefit to mining industry.
97	SNTMO M/101/2020	E-waste management and recovery of valuable metals through Hydrometallurgy towards Urban mining (Duration: 3 Yrs, 0 Mth)	Develop an environmentally benign hydrometallurgical method for the extraction of valuable metals from the e-waste such as Printed circuit boards (from PCs, TVs, mobile phones etc). Selective extraction of rare-earth and precious elements in addition to conventional transition and other elements (including isolation of toxic elements like Hg, Pb, Zn etc). To develop selective separation method for metals of interest from the dissolved solutions of electronic waste and also to isolate the toxic metals. The rare-earth and precious elements will be targeted for extraction from e-waste using mild organic acids (ascorbic acid, citric acid, oxalic acid, maleic acid, tartaric acid, glycine, IDA etc). Design an automation process for the dismantling and treating the e-waste. Set-up a pilot-plant scale method for treating the e-waste collected at the community level and/or Municipal (Belagavi city).	JayappaManjana (Rani Channamma University)	6148004.00	Not Recommended Pertains to Ministry of electronics & telecommunication
98	SNTMO M/102/2020	Phytostabilisation and bioaccumulation of chromium from South Kaliapani chromite mine overburden spoil using metallophytes through an ex situ phytoremediation approach (Duration: 3 Yrs, 0 Mth)	1. To study the impacts of toxic chromium containing overburden spoil on growth rate, physiological and biochemical parameters of selected plants. 2. Estimation of tissue specific Cr accumulation in different plant parts (root, stem, leaves). 3. Screening of plants for their phyto-accumulation and phytostabilisation potential by calculating phytoremediation indices. 4. Periodic assessment of chromium bioavailability in plants and soil samples to identify metallophytes. 5. Standardization of phytoremediation technique towards attenuation of chromium toxicity.	MONALISA MOHANTY (Rama Devi Womens University)	3545176.00	Not Recommended This project does not directly meet any of the thrust areas of research in mines..

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
99	SNTMO M/103/2020	Demonstration of KG Scale Molten Salt Electrolysis Pilot Plant for Production of Rare Earth Metals (Duration: 2 Yrs, 0 Mth)	The objective of the proposed project is to demonstrate a novel KG Scale Molten Salt Electrolysis Pilot Plant for Production of Rare Earth Metals and generate scale-up data for pilot cum semi-commercial / commercial production plant. The details include: i. To design and fabricate a KG scale laboratory pilot plant for molten salt electrolysis cell to carry out electrolysis to produce Rare Earth Metals ii. To produce purified electrolysis grade basic precursor material (rare earth chlorides) and electrolyze the same for metal production. iii. To optimize the process parameters i.e electrochemical, temperature, feeding, and harvesting. iv. To standardize the design of a suitable molten salt cell system and generate data for scaling up to a semi-commercial scale.	Shanta Chakrabarty (kalinga institute of industrial technology)	3960580.00	Not Recommended Proof of concept required Source of REE Not verified No clarity
100	SNTMO M/104/2020	Development of sustainable Aluminium alloys with graphene wrapped rutile-TiO ₂ inclusions (Duration: 3 Yrs, 0 Mth)	The basic objective is to investigate the possibility of substituting harmful, synthetic materials in commonly used Aluminium based alloys with sustainable rare earth materials that are natural, abundantly available in the country. In this context it is proposed to utilize rare earth elements like rutile TiO ₂ , available abundantly in India, to modify the material properties of commonly used Al alloys. The objectives are • To develop rare earth based sustainable Aluminium alloys with rutile TiO ₂ and graphene inclusions • Cationic surfactant assisted wrapping of TiO ₂ particles with graphene sheets facilitating its electrostatic assembly & binding with its surface • The material as well the processing route to be sustainable and environmentally friendly. In this context, utilization of eco-friendly solid-state route by Friction stir processing is proposed to incorporate graphene wrapped TiO ₂ in Al alloys • Fine tuning of composition and to establish a structure property relationship	Jinu Paul (National Institute of Technology Calicut)	3393700.00	Not Recommended Application not focused. Objective not focused
101	SNTMO M/105/2020	Micro-chemical engineering of Red-mud using Chemical Etchants to Enable High-Performance Na ⁺ Pseudocapacitors (Duration: 3 Yrs, 0 Mth)	The specific objectives are as follows; • Micro-chemical engineering of the red mud • Effect of porosity on the electrochemical activity of the as-modified red mud • Design and fabrication of pseudocapacitor devices • Theory calculation to insight electrochemical reaction pathways	Vipin Kumar (Indian Institute of Technology Delhi)	4664500.00	Not Recommended Theoretical in nature No application defined

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
102	SNTMO M/106/2020	UTILIZATION OF MARBLE DUST TO DEVELOP NOVEL GEOMATERIAL AND PROTOCOL FOR ITS BULK APPLICATION AS A SUBGRADE MATERIAL FOR HIGHWAY CONSTRUCTIONS. (Duration: 3 Yrs, 0 Mth)	The overall objective is to develop marble dust a novel Geo-material for its bulk utilization in subgrade preparation in highway construction, and to prepare proper protocol/guidelines. Following specific objectives have been planned in the proposed research project: 1. Detailed characterization of marble dust of varying mining sites and its interaction behaviour with 3 different types of soils. 2. To determine the engineering properties of marble dust amended soils at static loading conditions with or without considering extreme environmental conditions [freezing-thawing (-30 to +60 oC) and wetting-drying cycles]. 3. To finding their dynamic properties for designing the durable subgrade structure under long-term repeating traffic loading and extreme environmental conditions. 4. Examine the physicochemical and microanalyses to elucidate the mechanism and, to validate the experimental outcomes. 5. Validate the experimental outcomes with available guidelines and draft protocol.	ARVIND KUMAR JHA (Indian Institute of Technology Patna)	5962900.00	Not Recommended Project does not meet any of the thrust areas of research in mines.
103	SNTMO M/107/2020	Design of Portable Solar Based-Advanced Oxidation Reactors for the Removal of Cyanide, Mercury Hazards from Gold Mining (Duration: 3 Yrs, 0 Mth)	The main objective of the proposed research work is to design the portable solar based-advanced oxidation reactor to protect plants and animals near gold mines by removing the mining hazards such as cyanide, mercury, and other toxic elements from the water. Though many such attempts have already been made, the lack of stable and efficient visible light harvesting photo catalysts emerged as an impediment associated with the construction of advanced photocatalytic reactors. Through this project we will overcome this challenge by designing highly stable and efficient photocatalyst. The details of the photocatalytic reactor design, theoretical aspects and their utilization to eliminate hazards is described in in the work plan. The accomplishment of the proposed research work will open new avenues to develop low price solar based-advanced oxidation reactors to remove the hazards presented in the water near gold mines and other industrial places, and towards the environmental remediation.	D AMARANATH A REDDY (Indian Institute of Information Technology Design and Manufacturing Kurnool)	2591300.00	Not Recommended Project does not meet any of the thrust areas of research in mines.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
104	SNTMO M/108/2020	Red Mud Valorization to Achieve Zero Waste, Conversion of Residue Into Diagnostic X-Ray Shielding Tiles After Recovery of Scandium (Duration: 3 Yrs, 0 Mth)	The main objective of this project is to promote the zero-waste utilization of red mud. This main objective articulates into few work packages (WPs). The amount of works involved in each WPs is discussed in the methodology section. The interconnection between each WPs and the responsible laboratory is schematically illustrated in the pert diagram. WP1: Mineralogical, chemical composition and thermochemical analysis of red mud. WP2: Acid Leaching and Recovery of Sc from leach solution using solvent extraction technique and purification. WP3: Fabrication of industrial X-ray and γ -ray shields through hot compaction using unleached (as-collected) red mud. WP4: Fabrication of diagnostic X-ray shielding tiles through ceramic route using red mud residue. WP5: Mechanical strength, density and leaching studies of the developed shield. WP6: Diagnostic, industrial and γ -ray attenuation characteristics of developed shield.	ShabiThankaraj Salammal (CSIR Advanced Materials and Processes Research Institute)	10308080.00	Recommended Project envisages bulk and specialised utilisation of red mud
105	SNTMO M/109/2020	Up-scaling studies and Industrial trial of Developed of ash-Al-alloy based metal matrix composite hybrid (Duration: 1 Yrs, 3 Mth)	1. To save the environmental pollution by utilizing the coconut shell ash in large quantity 2. To prepare hybrid MMCs alloys using 1100 Al-alloys composites, coconut shell Ash 3. To study the mechanical behavior such as tensile testing, elastic modulus, Brinell hardness, wear results of the hybrid MMCs using Al-alloys/Ash/ (MWNT) materials 4. To study thermal properties study (TGA, DSC and thermal expansion) and resistance behavior (acid resistance, base resistance, and solvent resistance) 5. To co-relate the structure- property of the hybrid composite materials to establish cost effective and quality technology 6. To replace high strength series aluminium composites by the hybrid MMCs 7. To scale-up the hybrid MMCs materials for high technology applications such as automotive and aerospace	MUKTIKANT A PANIGRAHI (North Orissa University)	2951000.00	Not Recommended Project does not meet any of the thrust areas of research in mines and is not in the madate of ministry of mines.
106	SNTMO M/110/2020	Technology development for the beneficiation of Silica (SiO ₂) to extract metallurgical grade Silicon (MG-Si) at lab scale (Duration: 3 Yrs, 0 Mth)	Silicon extraction technology is well developed for over five decades by many countries. However, it is surprising to notify that no Indian industries were involved in the production of silicon because of the challenges involved in the beneficiation process of SiO ₂ . Carbothermal reduction of SiO ₂ is adopted by industries, widely. Even though, concerns over environmental protection and energy consumption proceeds to find an alternative. A recent technology was demonstrated at lab-scale for the electrochemical reduction of SiO ₂ using CaCl ₂ electrolytes, that seems promising to overcome those issues. As we are at the earlier stage of technology development, it is necessary to testify both processes to find a suitable method among them. Through this project it is proposed to demonstrate carbothermal and electrochemical reductions of SiO ₂ at lab scale for the extraction of metallurgical grade silicon (MG-Si) and to find a suitable technology to be adopted for large scale production of Si.	NIRMAL KUMAR VELU (CSIR Institute of Minerals and Materials Technology)	6781982.00	Not Recommended Objectives not defined. No novelty.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
107	SNTMO M/111/2020	High-temperature molten salt electrolysis of metal-oxide phase mixture for development of high entropy alloys for energy applications (Duration: 3 Yrs, 0 Mth)	(i) To synthesize high entropy alloys using high-temperature molten salt electrolysis of oxide phase mixture (ii) Structural and microstructural characterization of the samples prepared. (iii) Evaluation for potential hydrogen storage applications of the sample prepared based on alloy design. (iv) Thermoelectric characterization of the samples prepared based on alloy design.	Amritendu Roy (Indian Institute of Technology Bhubaneswar)	4456176.00	Recommended The project envisages alloy development and it is need of the hour for aluminium sector in country.
108	SNTMO M/112/2020	Data driven approach for Predictive maintenance of Conveyor motor system in mining industry through Internet of Things (Duration: 3 Yrs, 0 Mth)	• Design and development of Hardware test bench for testing conveyor motor. • Study the behavior of conveyor system for various fault conditions. • Design and development of fault detection and preventive maintenance scheme for Conveyor motor system using Machine leaning algorithm. • Validation of the proposed scheme with Real-time conveyor system in mining industry • Implication of remote monitoring and fault analysis through IoT.	Pappa N (Anna University)	3332750.00	Not Recommended Project does not meet any of the thrust areas of research in mines. This is a material handling project not strictly a beneficiation process. No novelty in the project.
109	SNTMO M/113/2020	Development and Characterization (Mechanical and tribological behavior) of ZA-12 filled metal matrix novel composites for Engineering Applications (Duration: 3 Yrs, 0 Mth)	1. New class of composites based on ZA-12 product matrix Strengthened with carbide particles of alumina and silicon. 2. Characterization of these composites physical and mechanical. 3.The wear characteristics of these ceramic rigid particle erosion analysis composites of ZA-12 improved particulate metal matrix under different test conditions. 4.The statistical analysis is based on Taguchi's experimental design for the erosion wear process parametric assessment for the composites under investigation and predictive equations growth. 5. Implementation of the artificial neural network for prediction of wear such composites have been responded to under different operating conditions.	S.R.RAJABAL AYANAN ()	2657816.29	Not Recommended Focused application missing. Component selection missing General in nature

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
110	SNTMO M/114/2020	Investigation on safety challenges in the Panna Diamond Mining industry of Madhya Pradesh. (Duration: 3 Yrs, 0 Mth)	Considering the growing demand for safety in the diamond mining workplace and pressure from various NGOs, the primary objectives of this project are as follows: a) Investigation on the data of diamond mining accidents in Panna and their causes. b) Investigation of barriers for safety in the Panna diamond mining industry c) Analysing the role of human behaviour in mining safety. d) Designing an accident-free workplace for diamond mining in Panna. e) Analysing the correlation between safety at mining workplace and training at regular interval. f) Analysing the cost-benefit ratio for investment in safety measures and training. g) Analysing the efficiency of Panna diamond mining industry, having a safe work environment. h) Analysing the challenges in implementation of safety measures in mining industry.	Akhilesh Barve ()	2246370.00	Not Recommended Project related to safety of mines, which is comes under DGMS Not mandate of MoM
111	SNTMO M/115/2020	Integrated Geological, Geochemical, Remote Sensing and GIS studies for the delineation of Potential Gold and associated mineral deposits in Mallasamudra area, Gadag Schist Belt, Karnataka, India. (Duration: 3 Yrs, 0 Mth)	1) To delineate the subsurface structure and potential gold mineralization zones and its extension. 2) To distinguish the Geological and Geochemical expression of the deposit and alteration signatures for the presence of gold and associated minerals. 3) To describe the mineralogical signature and its variations in mineral chemistry. 4) Study of ultrabasic components of Mallasamudra area for seeking Sulphide mineralisation zones. 5) Geophysical survey to understand the subsurface rock and minerals behavior 6) Applying Geochemistry, GIS and Remote Sensing techniques in the present study.	CHANDRASH EK HARAPPA AGASNALLI (B M SREENIVASIA H EDUCATIONA L TRUST)	5737750.00	Not Recommended The proof of concept and deliverables not well defined.
112	SNTMO M/116/2020	Value Addition to Over Burden and Lean Ore from SukindaBoula-Nuasahi Region (Duration: 3 Yrs, 0 Mth)	Recovery of Fe-Cr-Ni compounds from Alluvium, Murrum and Lateritic ore available near SukindaBoula-Nuasahi Region.	SANTOSH KUMAR SAHOO (National Institute of Technology Rourkela)	4187200.00	Recommended This project has technical merit of process development for low grade overburden material.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
113	SNTMO M/117/2020	Production of clean fuel using lignite and value added by product. (Duration: 3 Yrs, 0 Mth)	1 Isolation and characterization of the fungi (extracted from marine or any other habitats). 2 Modifying existing anaerobic bioreactors for the conversion of lignite into clean fuels. 3 Augmentation of the process parameters such as amount of moisture content, temperature, pH and hydrogen concentration. 4 Process optimization for effective conversion. 5 Effective bio conversion of the lignite using suitable microbes to yield clean fuel 6 Appraisal of the by-product obtained during the bioconversion process. 7 Elimination or reduction of the impurity like sulphur. 8 Cost effective production of the fuels using the existing and modified organisms. 9 Study of the efficiency of the clean fuels produced.	AH Manjunatha Reddy (RashtreeyaSikshana Samithi Trust)	4569000.00	Not Recommended Project related to fuel. This project does not meet any of the thrust areas of research in mines. This project is related ministry of coal.
114	SNTMO M/118/2020	Process Development and Techno-economic Evaluation for Continuous Conversion of Medium Purity Indian Natural Graphite to Functionalized Graphene for Energy Storage Application (Duration: 3 Yrs, 0 Mth)	1. To develop a semi-automatic, simple and cost-effective process for continuous conversion of medium purity (85 - 90%) natural flake graphite to functionalized graphene in the scale of 2 kg capacity per batch; 2. To achieve the high production rate of functionalized graphene without or less amount of collagen protein by using oxidizing agent and organic acid under mechanical driving forces; 3. To obtain energy storage performance of graphene with capacitance in the range of 200 – 250 F/g at a charging rate of 1 A/g and high cycle life (>10000) using the proposed methodology; 4. To optimize the complete process using industrial grade chemicals, and techno-economic evaluation for the continuous production of functionalized graphene from medium purity Indian flake graphite.	Ranjan K Sahu (CSIR National Metallurgical Laboratory)	123.08	Recommended Upcoming application of graphene
115	SNTMO M/119/2020	Development of hybrid flocculants for effective dewatering in iron ore processing plants (Duration: 3 Yrs, 0 Mth)	• To develop PAM based polymeric flocculants in their non-ionic and anionic forms, modification of polyacrylamide by (i) reaction with hydroxyl amine hydrochloride (ii) hydrolysis of the amide group (iii) grafting PAM on to cellulose to derive cellulose-g-PAM copolymers. • Isolation and synthesis of surface active additives from by product of the vegetable oil refining industry, inclusion of these surfactant molecules in the formulation and evaluating the efficacies for dewatering the mineral ores. • Development of hybrid formulations and selective dispersion-flocculation study of these materials in lab scale • Pilot scale efficacy study with the selected formulations.	RATI RANJAN NAYAK (CSIR Indian Institute of Chemical Technology)	9253450.00	Not Recommended Project pertains to Ministry of steel

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
116	SNTMO M/120/2020	A Study of Ancient Mining, Metallurgy and Geo-heritage and Archaeometallurgy and community heritage of Chitradurga Schist Belt, Karnataka (Duration: 3 Yrs, 0 Mth)	Karnataka is home to some of the oldest geological formations the world which have in their own way overtime nurtured distinctive cultural and geological landscapes, including the Archaen complex made up of Dharwad schists and granitic gneisses. The Dharwar craton consists of two continental blocks, the Western and Eastern which are separated by closepet granites with the Chitradurga Shear zone marking the boundary between these. This narrow shear zone which extends from Gadag in the north to Srirangapatna in the south over 400 km is at a maximum width at Chitradurga and has numerous sedimental and volcanic rocks that host considerable reserves of economic mineral deposits, include copper mineralization.	Sharada Srinivasan (National Institute of Advanced Studies)	13639780.00	Not Recommended Not thrust area of MoM Not relevant. Poor Justification
117	SNTMO M/121/2020	Development of Crash-worthy Light Weight Metal Matrix Nano Composite and Alloy Auto Wheels with Improved Mechanical Properties (Duration: 3 Yrs, 0 Mth)	The objectives are as follows: • Design engineering of Alloy wheels for Crash Performance deploying advanced modeling and CAE tools and virtual validation of designs to meet the functional and performance requirements o To achieve the resistance force of 300kN with max 25mm displacement o 4% elongation in Spoke section of wheel, and yield strength >190MPa • Design and development of new light weight metal matrix nano composite wheel reinforced with SiC, Al2O3 and Graphene Flakes	Ajay Kumar (Indian Institute of Technology Tirupati)	12499272.00	Recommended Project for downstream product development of aluminium
118	SNTMO M/122/2020	Development of a Classification System for the Pit Slope Stability Assessment of Opencast Non-Coal Mines in Southern India (Duration: 3 Yrs, 0 Mth)	Objectives: a) Study the layout of the opencast non-coal mines by visiting the mine project sites. b) The models will be developed by varying the pit height, height of individual bench, slope angle, berm width by incorporating rock properties along with the external loading by dumps/structures. Each model will be analyzed to find the Factor of Safety (FOS) of pit slopes. a) Detailed geological investigations i.e. joint dip amount / dip direction, joint spacing, condition of the discontinuities and shear zones in the field. b) The input parameters like rock properties (Strength parameters) tests will be carried out in the field and laboratory. c) Design of pit/bench slopes under different geo-mining conditions by using numerical and analytical methods. d) Development of guidelines for monitoring of slopes. e) Develop a classification system for slope stability assessment in opencast non-coal mines. Accordingly, design guidelines and design equations/charts will be developed.	Sandi Kumar Reddy (National Institute of Technology Karnataka Surathkal)	7039810.83	Not Recommended Project is not thrust area as well as mandate of MoM

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
119	SNTMO M/123/2020	Preparation of synthetic zircon from zircon minerals of beach sand, its characterization and value addition as thermal and electrical insulator (Duration: 3 Yrs, 0 Mth)	The objective of the project proposal is • To prepare zirconia nano materials from zircon minerals of Beach sand. • To prepare composite tetragonal zircon or synthetic zircon from zirconia nano materials and fumed silica. (The tetragonal phase is stable at temperatures between 1170-2370 °C.) • To establish the use of synthetic zircon as thermal insulator. • To establish the use of synthetic zircon as electrical insulator in switch gear protection equipment.	SUNITA ROUTRAY (SOCIETY RAMAN EDUCATION)	3183200.00	Recommended The project has pre-developed proof of concept Application/end use and objective is well defined
120	SNTMO M/124/2020	Synthesis of nanostructured GaN Application to gas sensor for the detection of toxic gases (Duration: 3 Yrs, 0 Mth)	1. Synthesis of nanostructured GaN 2. Fabrication of GaN sensor 3. Detection of toxic gases using IOT technology	B. N.Shashikala (SIDDAGANGA INSTITUTE OF TECHNOLOGY)	2248066.16	Not Recommended Project related to detection of toxic gases in mines and in niether thrust area nor mandate of MoM.
121	SNTMO M/125/2020	Geo-technological evaluation of Bauxite and Laterite deposits of Chhattisgarh State by using Geospatial technology under Smart Mining 4.0 (Duration: 2 Yrs, 0 Mth)	The project work is proposed to be carried out in close co-operation of organizations viz. JNARDDC and Chhattisgarh Council of Science & Technology, Chhattisgarh. The following objectives laid down for this project. Geo-technological evaluation of Bauxite and Laterite deposits of Chhattisgarh State under Smart Mining 4.0 programme ? Creation of district wise digital database of laterite and bauxite deposits for Chhattisgarh State using geo-referenced cadastral maps and high-resolution satellite imageries	Pravin G Bhukte (Jawaharlal Nehru Aluminium Research Development and Design Centre)	6652100.00	Recommended The project should be partially funded by Chhattisgarh State government or should be carried out by DGM Chhattisgarh in collaboration with JNARDDC.
122	SNTMO M/126/2020	Development of processflowsheet to recover ceramicmaterial from fly ash-a waste generated from coal in thermal power plant (Duration: 3 Yrs, 0 Mth)	• To reduce the size of fly ash- first process is physical beneficiation i.e. comminution study which is followed by chemical process i.e. leaching of iron from fly ash rocks. • To recover ceramic grade material from fly ash – a waste generated from thermal power plant • To optimize the leaching reaction by using various acids. • To characterize and evaluation of the product obtained. • To develop a process flow for recovery of valuable material from fly ash. • Simulation and modelling of the leaching process by applying advanced software for sustainable industry, by projecting the technique. This proposal is one of the efforts to reduce the waste and make it a resource for recovery of valuable material for ceramic industrial applications.	Ranjita Swain (SOCIETY RAMAN EDUCATION)	3456600.00	Not Recommended This project does not meet any of the thrust areas of research in mines. And is related to recovery of ceramic material from fly as of thermal plants

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
123	SNTMO M/127/2020	Artificial Intelligence based Estimation of Important Parameters for Centralized Stockpile Monitoring (Duration: 3 Yrs, 0 Mth)	• Artificial intelligence based estimation of ore grades for mineral deposit evaluation • Determining the volume of the stockpile using 3D Laser scanner/Total station	SHANTHI C (Anna University)	2676500.00	Not Recommended This project does not meet any of the thrust areas of research in mines and related to AI in monitoring the stockpile.
124	SNTMO M/128/2020	Recovery of carbon values from the waste lying in the tailing impoundments through physical and physico-chemical processes (Duration: 1 Yrs, 0 Mth)	The main objective is to beneficiate the waste lying in the tailing impoundments through physical and physico-chemicals beneficiation routes for its value addition	ASHISH KUMAR GHOSH (CSIR Central Institute of Mining and Fuel Research)	5000000.00	Not Recommended Project pertains to Ministry of Coal.
125	SNTMO M/129/2020	Gas Storage Performance Mapping of Indian Coal, Shale and Rock of Unconventional Reservoirs by a High Precision Sorption Setup and Development of Standard Guidelines (Duration: 3 Yrs, 0 Mth)	i. Geochemical and maturity assessment of coal and shale of Tertiary and Gondwana deposits. ii. Development of high precision and high-pressure adsorption isotherm setup iii. Development of standard guidelines for conducting high-pressure adsorption isotherm on coal/shale and rocks of India. iv. To find out sorption kinetics of storage and diffusion of coal and shale v. Development of suitable software for determination of sorption capacity considering, compressibility, z-factor, head space correction and void volume correction for different gases like CH ₄ , CO ₂ , N ₂ and mixture. vi. Development of a database for sorption capacity of Indian coal and shale deposits.	VINOD ATMARAM MENDHE (CSIR Central Institute of Mining and Fuel Research)	26415250.00	Not Recommended Projecty pertains to Ministry of Coal.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
126	SNTMO M/130/2020	Bio-Reverent- Recover of Ga, Ge and In through innovatfve biotechnology and process integration (Duration: 3 Yrs, 0 Mth)	The overarching objective of this project is the recovery of gallium (Ga), germanium (Ge) and indium (In) from zinc (Zn), copper (Cu) and aluminium (Al) production operations present in India. There are four major challenges in the recovery of Ga, Ge and In from such ores/waste are – 1) Low concentration of these metals in the primary ores, 2) Excess of Fe(III) that hampers the down streaming of the process, 3) Lack of effective technology for recovery and 4) Lack of process integration and intensification for commercially viable recovery. The specific objectives are: 1) Leaching of Ga, Ge and In from ores, intermediate steps and wastes 2) Removal of Fe(III) from the leachates through chemical and biological methods 3) Recovery of Ga, Ge and In from leachates through complexation with desferrioxamine B and E and decomplexation 4) Process integration of leaching, Fe(III) removal and complex separation 5) Operation at 100 L/ day scale to demonstrate the techno-economic feasibility	Rohan Jain (Indian Institute of Technology Delhi)	7736040.00	Recommended Potential for recovery.
127	SNTMO M/131/2020	Health hazards of post mining industrial waste and development of bio-hydrometallurgical remediation technique (Duration: 3 Yrs, 0 Mth)	? To investigate spatial distribution of REEs in water resources close to mining site. ? Identify and evaluate the link between the health risks associated with exposure of residents to contaminated water resources. ? Assess the performance of biohydrometallurgical process for recovery of REEs from contaminated soil and water.	Sruthi K V (KSCSTE Centre for Water Resources Development and Management)	2404.22	Not Recommended This project does not meet any of the thrust areas of research in mines.
128	SNTMO M/132/2020	Preparation of TiB2 powder from rutile through thermal plasma process (Duration: 2 Yrs, 0 Mth)	• Synthesis of TiB2 by thermal plasma process from rutile • Study of the effect of composition and process parameters on the formation of TiB2 by thermal plasma. • Optimisation of composition along with process parameters to achieve very fine and high purity TiB2 powders.	Silani Sahoo (CSIR Institute of Minerals and Materials Technology)	4844500.00	Not Recommended No Novelty Very General in nature.
129	SNTMO M/133/2020	A novel energy saving fast steering system for underground mobile equipment (Duration: 3 Yrs, 0 Mth)	The DC steering system results in more articulation motion for the same steering wheel rotation with respect to a conventional standard system. Hence, the new DC steering system utilizes the fuel more efficiently by performing more work while consuming less fuel. This leads to a considerable increase in fuel usage efficiency, which is considered a substantial improvement over the state-of-the-art by all measures.	JAYANTA DAS (Indian Institute of Technology ISM Dhanbad)	2537000.00	Not Recommended Not thrust area of MoM No novelty.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
130	SNTMO M/134/2020	Biomechanical analysis of human head, neck, thorax and design of miners PPE (safety helmet and body vest) against fall protection (Duration: 3 Yrs, 0 Mth)	1) To experimentally measure the biomechanical response of surrogate human head, neck, and thorax under mine fall environments (ground and other). 2) To validate full-body human finite element models under the mine fall environments (ground and other). 3) To assess the degree of lethality under mine fall loadings and to evaluate the effectiveness of personal protective equipment (PPE) for protection against mine falls. 4) To improve the design of personal protective equipment (PPE) for protection against mine fall environments.	Shailesh Govind Ganpule (Indian Institute of Technology Roorkee)	4951700.00	Not Recommended Project in not the thrust area of Mom as it relates to related to Health & Safety of miners,
131	SNTMO M/135/2020	Microbial intervention to rehabilitate feldspar mined land in Rajasthan (Duration: 3 Yrs, 0 Mth)	• To analyze existing Physico-chemical and biological diversity in Various Feldspar Mined Spoils in Rajasthan. • To identify possible indigenous microorganisms having the potential to revive the disturbed mine land in Rajasthan. • To assess the performance of identified microorganisms in combination with Inorganic – Organic amendments and various plants with Feldspar Mined Soil, in Pot Experiment. • To modify regime and required soil tailoring. • To assess the performance of various combinations on identified feldspar field. • To analyze the results data. • To transfer the technology to various mined wastelands in collaboration with industry/NGO.	GAJENDRA KUMAR ASERI (Amity University Rajasthan Jaipur Campus)	5132920.00	Not Recommended Project does not meet any of the thrust areas of research in mines and is related to reviving mined land through microorganism.
132	SNTMO M/136/2020	Development of coating for reducing air burn (net carbon consumption) of anodes in aluminium electrolysis cell (Duration: 2 Yrs, 0 Mth)	• Develop alumina-based anode coating material for minimizing air burn of anodes to reduce net carbon consumption in aluminium electrolysis cell. • Study the effect of coating material on metal purity and recyclability of anode butt	SUCHITA B. RAI (Jawaharlal Nehru Aluminium Research Development and Design Centre)	9692800.00	Recommended The concept is well defined. Replacement of imported material Indigenisation of technology

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
133	SNTMO M/137/2020	Preparation and Characterization of Biocompatible Alumina based Nanocomposites for Dental Implants (Duration: 2 Yrs, 0 Mth)	<ul style="list-style-type: none"> To prepare biocompatible and corrosion-resistant alumina composite coatings on Titanium metal substrate to achieve the desirable properties for bone in-growth. The nanostructured mixed ceramic oxide coatings on Titanium with various formulations such as Al₂O₃- ZrO₂, Al₂O₃- Ta₂O₅, Al₂O₃- Nb₂O₅, Al₂O₃- CeO₂ will be done to enhance the bioactivity of the implant. The cells proliferation rate will be analyzed using cell viability kit. Cell morphological analysis studies will be carried out to analyse the cells spreading. The expression of the genes (OPN, OCN, Col 1, ALP, osteonectin, RUNX2, BMP-2) responsible for osteogenesis will be analysed using RT-PCR. The histomorphological analysis will be done to evaluate bone formation and mineralization in animal models. The bacterial adhesion test will be carried out for various time periods to understand the inhibition effect of the prepared sample. 	N.Rajendran (Anna University)	9055200.00	Recommended Concept is well defined and relates to product development
134	SNTMO M/138/2020	Characterisation of jointed rockmass using digital photogrammetry for advanced pit slope stability and design (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To undertake a digital photogrammetry using terrestrial & aerial image for rock fabric mapping Compare the results with manual joint mapping methods (window/cell sampling), ISRM suggested methods Gather RMR, GSI and SMR data to characterize the rockmass Understand application of short-range & long-range photogrammetry at different camera exposure setting and lighting condition Study & validate existing pit design parameter with probabilistic joint model analysis for bench-berm design Study & delineate geotechnical risk prone area in pit walls Devise appropriate monitoring strategy for bench scale pit instabilities. 	Ram Manohar Bishwal (National Institute of Technology Rourkela)	8710500.00	Not Recommended No novelty in the project.
135	SNTMO M/139/2020	Health hazards of post mining industrial waste and development of the bio-hydrometallurgical remediation technique (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To investigate spatial distribution of REEs in water resources close to mining site. Identify and evaluate the link between the health risks associated with exposure of residents to contaminated water resources. Assess the performance of biohydrometallurgical process for recovery of REEs from contaminated soil and water. 	Sruthi K V (KSCSTE Centre for Water Resources Development and Management)	5812370.00	Not Recommended Same project at SI .No 127 (SNTMOM/131/2020). This project uploaded twice

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
136	SNTMO M/140/2020	Screening Isolation and Characterization of Potential Bacterial Strains for Bio-Mining of Metals from Different Mining Areas of Telangana State (Duration: 3 Yrs, 0 Mth)	? To determine the heterogeneity in the metals content in the ore (low grade etc.) ? Isolation and screening for potential bacterial strains capable of bioleaching of metals (Cu, Au, and Ag) from the ore under study. ? To conduct optimization experiments for maximum recovery of metals (Cu, Au, and Ag). ? Characterization studies by using advanced instruments like SEM, EDX and FTIR etc.	Pindi Pavan Kumar (Palamuru University)	4581470.00	Not Recommended Project is generic in nature and copcetualized based on available literature. No novelty in the project.
137	SNTMO M/141/2020	Development of low cost filler material utilizing Lithomargic clay for paint industry as per IS 68 2006 standard (Duration: 2 Yrs, 0 Mth)	Objective To utilize Lithomargic clay for development of low-cost filler material for paint industry as per IS:68 (2006) standard To validate product (filler) as per norms of Indian standards for paint industry	Pravin G Bhukte (Jawaharlal Nehru Aluminium Research Development and Design Centre)	5533600.00	Recommended Project aims at feasibility of obtaining a low-cost filler material for paint industry use.
138	SNTMO M/142/2020	Identification of potential sedimentary formations, OB dumps and development of indigenous extraction procedure for strategic Trace metals and REE in shale and associated rocks (Duration: 3 Yrs, 0 Mth)	i. Evaluation and identification of sedimentary formation and over burden (OB) having potential for strategic trace metals and rare earth elements (REE) of shale and rocks of Gondwana and Tertiary formation in India ii. Source evaluation and accumulation process of trace and REE iii. Mapping of potential sites considering the strategic importance iv. Development of extraction procedure based on the concentration of REE found in the shale and rocks v. Resources estimates and economics evaluation	JAYWARDHAN KUMAR (CSIR Central Institute of Mining and Fuel Research)	39346450.00	Recommended Identification of new REE sources

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
139	SNTMO M/143/2020	Synthesis and Characterization of Nano Bronze Powder to Produce Bronze Bushing from Additive manufacturing Using Selective Laser Melting (Duration: 3 Yrs, 0 Mth)	The rapid solidification is the process of increasing the cooling rate of the melt. During the process of rapid solidification there is an increase in solid solubility of the alloy as a result of solid solubility strengthening of the alloy. Spray atomization process is one such technique employed to produce different sizes of the powder varies from 10 µm to 100 nm. The large powder particles exhibit coarse grains and dendritic structure, where as smaller sized powder particle exhibits cellular morphology. This is due increase in cooling rate of the droplets as a result increase in solid solubility of one element in the other element. The spray comprises of different size of the powder, large powder particle are elongated and irregular shape, smaller powder spherical are spherical in shape results in increase in surface area to volume ratio. The bronze powder is produced by spray atomization process.	DevarajaSonnappa (RUKMINI EDUCATIONAL CHARITABLE TRUST)	2874000.00	Not Recommended Objectives missing. No novelty Mismatch among title and objectives
140	SNTMO M/144/2020	Geochemical and geophysical investigations for delineating the potential REE zones and link processes involved in distribution in the marine environment (Duration: 3 Yrs, 0 Mth)	1. To understand the process link between river-estuary-onshore deposition. 2. To identify potential areas with enriched REE in marine environment.	Pratima M Kessarkar (CSIR National Institute of Oceanography)	32062330.00	Recommended Potential for exploring REEs
141	SNTMO M/145/2020	Development of a Classification System for the Dump Slope Stability Assessment of Opencast Non-Coal Mines in Southern India (Duration: 3 Yrs, 0 Mth)	a) Study the layout of the opencast non-coal mines by visiting the mine project sites in southern India. a) Detailed geological investigations i.e. joint dip amount / dip direction, joint spacing, condition of the discontinuities and shear zones in the field. b) The input parameters like subsurface geotechnical investigation, rock properties (Strength parameters) and settlement analysis of dump material tests will be carried out in the field and laboratory. c) Design of pit/bench slopes under different geo-mining conditions by using numerical and analytical methods. d) Development of guidelines for monitoring of dump slopes under different geo-mining conditions. e) Develop a classification system for dump slope stability assessment in opencast non-coal mines. Accordingly, design guidelines and design equations/charts will be developed for different geo-mining condition.	Sandi Kumar Reddy (National Institute of Technology Karnataka Surathkal)	9976310.83	Recommended Potential for evaluating stability of dumps in mines

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
142	SNTMO M/146/2020	Development and characterization of construction materials from industrial wastes using geopolymerization (Duration: 3 Yrs, 0 Mth)	To develop a new grade of construction material utilizing the industrial waste. To replace cement by reared hybrid geo-polymer with red mud and pond ash To study the effect of alkali on geo-polymer for high strength to established a cost effective and quality technology. To study the corrosion behaviour of the hybrid geo-polymer To study the wear behaviour of the industrial waste based geo-polymer	AJIT KUMAR SENAPATI (Vidya Bharati Educational Trust)	3854900.00	Not Recommended Project does not meet any of the thrust areas of research in mines
143	SNTMO M/147/2020	An integrated approach to sustainable mining (Duration: 3 Yrs, 0 Mth)	it would be apt to introduce concept of sustainable mining framework catering to dimensions of Society, Ecology & Economy. A further two layers of galvanization with parameters like Conservation, Accountability and Carrying capacity with topping of Gender equity, Diversity & Democratic shall be introduced in alignment with nature to develop a sustainable mining framework (SMF). An extensive statistical analysis will be carried out to find the relations and behaviour of socio economic and ecological parameters in terms acceptable models and tests which are vital for sustainable mining activities.	Satish Kumar Sinha (Indian Institute of Technology ISM Dhanbad)	3774460.00	Recommended Project has potential for sustainability in mining sector.
144	SNTMO M/148/2020	Development for Knee and Spinal Protective Devices for Improving the Health and Safety of Miners (Duration: 3 Yrs, 0 Mth)	After prolonged exposure to the working face in the undesired posture due to restricted space in the underground coal mines including the lifting of heavy objects, the miners develop “Lumbar Pain” in the spinal cord and knee pain over a while. Therefore, the specific objective of this research work is aimed at the design and development of Knee and Spinal Smart Protective Devices for improving health & safety of miners including improvement in the mine productivity.	Kalyan (Indian Institute of Technology ISM Dhanbad)	4793000.00	Not Recommended Project is not thrust area of MoM and is related health & safety of miners
145	SNTMO M/149/2020	Smart diagnostics modules for fault detection and degradation assessment of mining rotating machinery (Duration: 3 Yrs, 0 Mth)	The project aims to develop novel diagnostics models for heavy rotating machinery exploited on a huge scale in mining industry. Mining rotating machinery contain rolling element bearings whose failure causes a sudden breakdown of entire machinery resulting in economic losses and hazardous environment. To prevent these harmful state of affairs, there is an immediate need to expand diagnosis-based-maintenance strategies. In this regard, the project serves the following objectives: (i) Detecting the incipient bearing faults at an early stage. (ii) Tracking the naturally progressing degradation in bearings. (iii) Identifying and classifying and the type of bearing faults. (iv) Exploring the potential of acoustic emission technology for mining bearings. (v) Advancing the state of signal processing techniques for vibration and acoustic emission signals. (vi) Developing automated diagnosis models by applying artificial intelligence tool	AKHAND RAI (AHMEDABAD UNIVERSITY)	2867640.00	Not Recommended Project is not thrust area of MoM and is related health & safety.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
146	SNTMO M/150/2020	Establishment of safety and quality certification of hydraulic mining hoses through indigenization of impulse testing machine (Duration: 2 Yrs, 0 Mth)	Establishment of independent Test facility with capacity and competency for impulse testing of hydraulic hoses in India. • Establishment of Indian standard similar or better than BCS 174:1992, EN 856 for implementing safety and mandatory quality certification of Hoses for mining application. • Implementation of safety and quality certification of hydraulic mining hoses through indigenization of impulse testing machine. • Develop a life prediction model by conducting the impulse test at various temperatures by using Arrhenius principle and other life prediction models	Kasilingam Rajkumar (Indian Rubber Manufacturers Research Association)	8392100.00	Not Recommended Project is not thrust area of MoM and is related health & safety
147	SNTMO M/151/2020	Active Neutralization followed by Essential Metal Recovery from Acid Mine Tailings by one-on-one Bauxite Residue End-of Pipe Treatment Approach towards Sustainable Development (Duration: 3 Yrs, 0 Mth)	The specific objectives of the proposed research may be summarized as below: ?To study acid mine drainage/tailings treatment by neutralization followed by adsorption based dual-stage techniques ?To study a unique process to get the long-term neutralization of the acidic liquid effluents ? To develop novel materials which will effectively/selectively recovered copper and nickel from waste effluents with a high degree ?To develop a scale-up model for prototype for demonstration followed by practical field implementation	Suraj Kumar Tripathy (kalinga institute of industrial technology)	3091750.00	Not Recommended No Novelty Generic in nature
148	SNTMO M/152/2020	Development of a prototype system for effective suppression of dust generated during drilling and blasting operation in underground metal mines (Duration: 2 Yrs, 0 Mth)	- Development of prototype system for effective dust control generated by drilling and blasting operation in underground metal mines - Field trial of the developed system in underground metal mines and performance evaluation of the developed system	Nilabjendu Ghosh (CSIR Central Institute of Mining and Fuel Research)	13416700.00	Not Recommended Project is not thrust area of MoM and is related health & safety
149	SNTMO M/153/2020	To investigate the treatment of seepage water from chromite mine quarries of Odisha using phytoremediation technique (Duration: 3 Yrs, 0 Mth)	The aim of the proposed investigation is to provide safe water free from chromium contamination in and around chromite mines of Odisha. The specific objectives are as below: • Identification of the specific locations of contaminations • Develop the spatial contamination level of the region • collect and identify chromium accumulating aquatic plants • Provide an optimum condition for aquatic plant to reduce chromium contamination • Design a process to treat the seepage water • Cost analysis of the unit	SUSMITA MISHRA (National Institute of Technology Rourkela)	4048900.00	Not Recommended Project is related to soil remediation to remove chromium contamination

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
150	SNTMO M/154/2020	Development of Constitutive Relations for Coal, Considering the Influence of Intermediate Principal Stress and The Acoustic Emission Characteristics Under Triaxial Loading (Duration: 3 Yrs, 0 Mth)	Please see the attached PDF file.	Aditya Singh (Indian Institute of Technology Roorkee)	56192000.00	Not Recommended Pertains to Ministry of coal.
151	SNTMO M/155/2020	An Innovative IOT based gas pressure measurement using Capsule-Muck Securing Apparatus (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To prevent gas accidents happening in coal mines • To accurately determine the pressure of gas in coal seam • To develop a innovative, simplified and cost effective methodology to determine the pressure of gas in coal mines • To eliminate the large relative errors present in the indirect methods adopted for gas pressure measurement • To develop a more accurate and less time consuming direct method for measurement of gas pressure • To minimize the gas pressure related accidents in mines (especially Coal mines) 	Sevvel (Dharmanaidu Educational And Charitable Trust)	4304447.65	Not Recommended Project is not thrust area of MoM and is related health & safety.
152	SNTMO M/156/2020	Un-diluted Recycling of Cast Aluminium Alloys Containing High Fe Impurity Suitable for SMEs (Duration: 2 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Modify the morphology of Fe-rich intermetallics in the recycled cast aluminium alloys through minor alloy additions to remove its deleterious effects. • Remove Fe through filtration or sedimentation by addition of nano / micro / macro powders of Zr, Mn, Cr. • To optimize process parameters viz. powder composition, holding time and temperature for Fe removal. 	KAMESWARI PRASADA RAO AYYAGARI (BML MUNJAL UNIVERSITY)	14676350.00	Recommended Project to support recycling aluminium industry in India Melt quality is major concern among the recyclers
153	SNTMO M/157/2020	Studies on value addition of low grade iron ore fines through simultaneous carbonization and metallization using non-coking coal (Duration: 3 Yrs, 0 Mth)	The objectives of the project are to study- i) The potentiality of enrichment of iron content of fine size and low grade iron ore by beneficiation/washing, ii) Pelletization characteristics of beneficiated iron ore powder with different non-conventional organic and inorganic binder and binder optimization for pellet preparation in centrifugal pelletization machine, iii) Sintering characteristics of iron ore pellets with non-coking coal and char prepared from non-coking coal in conventional sintering process as well as in stagnant bed condition in coking furnace by simultaneous carbonization of coal and sintering of iron ore pellet. iv) Development of an alternative process for utilization of low grade iron ore and iron ore fines.	Manish Kumar (CSIR Central Institute of Mining and Fuel Research)	23720000.00	Not Recommended Pertains to Ministry of Steel.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
154	SNTMO M/158/2020	Novel Studies on the Role of HVOF Coatings to Combat Hot Corrosion, Oxidation and Erosion of Materials used in Turbine Components. (Duration: 3 Yrs, 0 Mth)	To identify the material failures, mechanisms of failures and to investigate on remedial solutions using surface coating techniques. To identify the erosion & wear behavior of coated and uncoated surfaces at different working conditions as per ASTM G76 standards.	JEGADEESWARAN N (RUKMINI EDUCATIONAL CHARITABLE TRUST)	3036100.00	Not Recommended Not thrust area of MoM as the project relates to Coating of mining equipments
155	SNTMO M/159/2020	Integrated study for strategic exploration of rare earth minerals (REE) from Jharkhand, India (Duration: 3 Yrs, 0 Mth)	Findings of host rock of REE mineral from Jharkhand, India sector is the primary objective of the current study. The study area has been chosen based on the geological setting which is encouraging for REE mineral exploration. After findings of host rocks of REE minerals such as Lanthanum (La), Praseodymium (Pr), Neodymium (Nd), Cerium (Ce) and Niobium (Nb) and detection of REE mineral's sample from host rocks is a secondary objective of the study. The study will be conducted Mahespur-KamtaNawatoli-JaratoliGiridih area of Jharkhand. Based on analytical result further extension study may be carried out in a wide area of Jharkhand.	SAURABH DATTA GUPTA (Indian Institute of Technology ISM Dhanbad)	14346450.00	Not Recommended The problem is not well defined No novelty.
156	SNTMO M/160/2020	Development of thermal efficient bricks using iron ore waste and tailings with different additives (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To assess the suitability of iron ore waste and iron ore tailings (IOT) based on their physico-mechanical properties to manufacture bricks • To find the suitability of additives like 'perlite' to make the bricks lighter and thermal efficient • To fix the optimal proportion of iron ore waste, IOT, cement and additives to achieve the optimum density, strength requirements and lower thermal conductivity based on the laboratory tests. • To assess the economic feasibility of the bricks made up of mine waste in comparison with normal bricks. • Conducting a pilot scale study by construction of model rooms with manufactured bricks along with locally available conventional bricks to assess the benefits. 	Karra Ram Chandar (National Institute of Technology Karnataka Surathkal)	4998110.00	Not Recommended Project does not meet any of the thrust areas of research in mines.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
157	SNTMO M/161/2020	Technology development on hydraulic transportation of ores, minerals from opencast mines (Duration: 3 Yrs, 0 Mth)	i. Development of a novel type hydraulic transport technology for lifting of ores/minerals from opencast mines, integrating with mine dewatering system. ii. Design of the hydraulic transport system integrating motive water pump, hydro-lift feeder, high pressure slurry pipeline lines to surface (vertical/inclined), concentrator etc. iii. Installation of the demonstration unit to integrate the mine dewatering with the hydraulic transport system to simulate the field condition. iv. Experimental investigation of flow behavior, pressure drop & concentration of coarse grained ores-minerals water mixture in horizontal, vertical & inclined pipe sections. v. Analysis of degradation rate of ore/mineral samples influenced by flow velocity, interfacial slip.	JAYANTA KUMAR POTHAL (CSIR Institute of Minerals and Materials Technology)	7250000.00	Not Recommended Project does not meet any of the thrust areas of research in mines as it relates to technology development for transporation of ores.
158	SNTMO M/162/2020	Coal stockpile volume estimation using machine learning based on satellite images (Duration: 3 Yrs, 0 Mth)	1) Design and development of a novel model for coal stockpile volume estimation using machine learning and satellite image processing. 2) Optimization of the algorithms which includes cost and efficiency. 3) Validating the algorithms and designing of GUI based application.	RAVI SHANKAR SINGH (Indian Institute of Technology BHU Varanasi)	4481000.00	Not Recommended Not mandate of Ministry of Mines. This project does not meet any of the thrust areas of research in mines.
159	SNTMO M/163/2020	Design and Development of Electromagnetic Interference Compatible Cables for Underground Mines (Duration: 3 Yrs, 0 Mth)	The objective of the project is listed as follows: • Characterize underground mining environments in the context of radiated energy to define the electromagnetic emissions spectrum and the interaction of electronic devices that may increase the potential for EMI in underground mines. • Develop/validate the effectiveness of carbon nano-fibres (CNF) to assess the radiated emissions and susceptibility related to electromagnetic interference • Developing the CNF mats that can be used in communication cables to enhance immunity and reduce susceptibility potential towards EMI • Comparing the performance of the CNF mats with that of other materials of EMI shielding. • Implementing the so developed CNF mats in the communication cables which will be used in underground mines.	Rengaraj (SSN TRUST)	3728620.00	Not Recommended Pertains to Ministry of power

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
160	SNTMO M/164/2020	Development of environmentally benign hybrid natural polymer- epoxy- metal oxide nanoparticle composites for anti-corrosive coating on mining equipment (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Characterization of natural resin and synthesis of nanoparticle • Develop an easy to use, one-pot, superhydrophobic surface coating. • Evaluate and understand the corrosion protection and conducting properties of such coating systems. • Assessment of the stability and degradation properties of such coating. 	Mahesh B (JSS MAHAVIDYA PEETHA)	4992360.00	Not Recommended Not thrust area of MOM
161	SNTMO M/165/2020	Residual life assessment of underground mine hoisting equipments by its physico-mechanical properties and modelling (Duration: 3 Yrs, 0 Mth)	Comprehensive scientific study and modeling of mine hoisting equipments (excluding ropes) a) To know their mechanical integrity and stress pattern through modeling& simulations and by fractograph, micrograph and metallographic study to assess their residual life left over after six years in service with a view to increase its life span. b) To minimize the capital investment in procurement of mine hoisting attachments and on the rework. c) To avoid unexpected component failure and premature replacement of components prior to the end of its useful life. d) To make the Bharat AATMANIRBHAR	Sudhir Kumar Kashyap (CSIR Central Institute of Mining and Fuel Research)	19330865.00	Not Recommended No novelty in the project.
162	SNTMO M/166/2020	Design and Development of radiofrequency (RF) resonator to sense the heavy minerals and hence to quantify rare earth elements in the coastal area of Tamil Nadu for mineral beneficiation of industries. (Duration: 3 Yrs, 0 Mth)	<ol style="list-style-type: none"> 1. To design and develop the RF resonator to sense the heavy minerals 2. To collect the beach sand samples along the coastal areas of Tamil Nadu 3. Profiling of heavy minerals using density separator for industrial benefits 4. To determine the concentration of Rare Earth Elements (REE) using Inductively Coupled Plasma - Optical Emission Spectrometry 5. To construct a heavy mineral mapping for the entire coastal area. 6. To validate the performance of RF resonator in sensing the heavy minerals. 	A.CHANDRAS EKARAN (SSN TRUST)	2508500.00	Not Recommended Not in mandate of Ministry of Mines.
163	SNTMO M/167/2020	Experimental Simulation of dust aerosols and its impact on indoor and outdoors for COVID-19 (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • A generic model will be proposed for lagrangian /Euler density based approach for N-S equations and energy equations. • Different turbulent flow conditions for various climatic conditions like COVID-19. • Basic experimental validation with concentric benchmark solutions. • The numerical model will be applied to weather boundary conditions and solution of weather forecasting convergence. • Convergence will be ensured on parallel algorithms of the numerical solution of aerosol model. 	Brajesh Tripathi (Rajasthan Technical University Kota)	9293920.00	Not Recommended Proposed outcome non specific for mining industry and does not meet any of the thrust areas of research in mines

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
164	SNTMO M/168/2020	Risk Profiling of Surface Mines and developing Advanced Driver Assistance System (ADAS) for Safe Driving of Trucks. (Duration: 3 Yrs, 0 Mth)	Improving the safety of movement of mobile equipment on mine roads in surface mining operations by a) Reducing vehicle interaction on mine roads in reduced visibility condition due to combined effect of excessive dust or fog, or rain or poor illumination, by developing an advanced driver assistance system using suitable sensors and artificial intelligence-based environment perception algorithms. b) Reducing accidents due to uncontrolled movement/sliding of mobile equipment by developing a procedure based on the measurement of frictional coefficient of the road surface and the study of the effect of different parameters like road profile and wetness of mine roads.	Ram Madhab Bhattacharjee (Indian Institute of Technology ISM Dhanbad)	17942848.00	Not Recommended Not thrust area of Ministry of Mines as it relates to health & safety of mines.
165	SNTMO M/169/2020	Fabrication of Al ₂ O ₃ containing cellulose based Ag NPs encapsulated Collagen dressing and investigation of its Therapeutic Opportunities in Diabetic Wound Healing (Duration: 3 Yrs, 0 Mth)	1. To synthesize Al ₂ O ₃ /AgNPs/Collagen/Cellulose device (Ag NPs encapsulated collagen matrix will be embedded on cellulose paper) and their characterization. 2. To investigate antibacterial, antibiofilm and possible molecular mechanism of Al ₂ O ₃ /AgNPs/collagen/cellulose device against pathogenic antibiotic resistant and non-resistant S. aureus and P. aeruginosa. 3. To check the activity of oxidative stress associated factors and expression of important genes will be evaluated using different molecular approaches. 4. To investigate biocompatibility of Al ₂ O ₃ /AgNPs/Collagen/Cellulose device under normal and hyperglycemia conditions towards mammalian cells followed by in vitro methods. 5. Al ₂ O ₃ /AgNPs/Collagen/Cellulose device will be used to evaluate the wound healing proficiency and elimination of infection caused by pathogenic bacteria in diabetic and non-diabetic mice (BL6 or BALB-c).	AMRITA MISHRA (kalinga institute of industrial technology)	1688400.00	Recommended New application of alumina powder
166	SNTMO M/170/2020	A study on effect of rare earth materials and reinforced nano-materials on microstructure and corrosion behavior of Al-Zn-Mg alloy processed through combined MDF and ECAP processes (Duration: 3 Yrs, 0 Mth)	The objectives framed for the present work are- 1) To prepare the alloy using rare earth material (scandium and yttrium) and reinforced nano-material (graphene). 2) To characterize the prepared alloy using scanning electron microscope, transmission electron microscopy and X-ray diffraction analysis before and after combined MDF and ECAP processes. 3) To study the effect of addition of rare earth material and reinforced nano-material on corrosion behaviour of the prepared alloy. 4) To study the effect of combined MDF and ECAP processes on corrosion behaviour of the prepared alloy. 5) To evaluate the mechanical properties of the prepared alloy before and after combined MDF and ECAP processes.	MANJUNATH G. K. (RUKMINI EDUCATIONAL CHARITABLE TRUST)	3341800.00	Not Recommended Application of alloy missing General in nature No Novelty.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
167	SNTMO M/171/2020	Design, Synthesis and Fabrication of Donor-Acceptor Based Fluorescent Sensing Organic-Nanomaterials and Devices for Detection and Quantification of Rare Earth Elements in Minerals (Duration: 3 Yrs, 0 Mth)	(i) DFT design of complementary CO-NH and NH-CO pair compounds, stacked system, role of p-p interaction and binding with REEs. (ii) Synthesis of paired complementary pyrene analogues and development of their photophysical properties. (iii) Fabrication of organic nanomaterials and their imaging analyses. (iv) Sensing RREs present in aqueous mineral solutions, leachates, industrial waste and suspension of minerals, and finding their selectivity as well as quantity. (v) Fabrication of innovative devices for detection and quantification of RREs in minerals.	Dilip Kumar Maiti (University of Calcutta)	7484500.00	Recommended Concept well defined. Upcoming area of research
168	SNTMO M/172/2020	Investigation of development and propagation of micro-cracks in rocks for prediction of rock burst in mines, using acoustic emissions and infra-red thermography. (Duration: 3 Yrs, 0 Mth)	Setting up of an experimental simulation model in laboratory which also includes the installation of AE and IRT monitoring system to study the mechanical characteristics of rock in dry and saturated condition To study the phenomena of rock fragmentation and microcracks generation from extraction of thermal features from the captured infrared images along with acoustic emission data to quantify the cracks To observe the characteristic variations in thermal distribution from the captured thermograms due to the stress wave propagation along with acoustics emissions numbers and energy ratio Establishment of a graphical relationship between the acoustic emission energy ratio and variation in the temporal temperature distribution and building an analysis model to forecast the rock burst incident in the mine To execute an insitu real-time observation campaign in collaboration with a leading mine company of India to reconnoitre the soundnes of developed early warning system	Resmi Sebastian (Indian Institute of Technology Ropar)	4278985.00	Not Recommended No novelty.
169	SNTMO M/173/2020	Assessment of Strategic (Ge and Ga) and Rare Earth Elements (REE) in Neyveli Lignite, Fly Ash and Bottom Ash and Recovery of Economically Viable Elements through Suitable Technique (Duration: 3 Yrs, 0 Mth)	The aim of the study is to assess and examine the association of Ge, Ga, and REE's with Neyveli Lignite and Lignite ash and to establish suitable techniques for the recovery of economically viable elements from these products. Specific objectives • To determine the occurrence, distribution, and concentration of Ge, Ga, and REE's in the Neyveli Lignite deposits and Lignite ash products. • To infer the Ge, Ga and REE concentration and its relation to the Size, Magnetic and specific gravity characteristics of the Fly ash/bottom ash • To evaluate and compute Ge, Ga, and REE leaching characteristics of lignite, fly ash, and bottom ash using the hydrometallurgical technique. • To develop a pilot plant at the laboratory scale and Prototype at industrial scale to estimate recovery rate and obtain economic viability.	Vasudevan S (Annamalai University)	19360200.00	Recommended Similar projects mentinongrecovery of Ga, Ge proposed earlier in the table. (SNTMOM/130/2020) PERC may take a view.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
170	SNTMO M/174/2020	Development of AI driven Smart Inspection Vehicle Unit (SIVU) for Underground Metalliferous Mines (Duration: 3 Yrs, 0 Mth)	1. To develop an unmanned vehicle capable which can autonomously navigate in and perform inspection of hazardous workplace in underground metal mines 2. To develop a system for sensing of data regarding workplace hazards like presence of noxious or toxic gases and strata instability 3. To develop protocol for decision making regarding entry or re-entry of workers in underground workplaces 4. To do a Proof of Concept demonstration of the vehicle in a suitably chosen mine	CHIRANJIB BHATTACHARYYA (Indian Institute of Science Bengaluru)	18485112.00	Recommended Project reduces the human interference in hazardous workplace in underground metal mines
171	SNTMO M/175/2020	Metakaolin Boiler-ash blended with M-Sand in Geo-Polymer Concrete for Production of Paver Blocks - A Prospective Study (Duration: 3 Yrs, 0 Mth)	The main objective of this research is to investigate the geopolymer binder using metakaolin boiler ash (MK - BA) blend with M- sand through various parameters like molar ratio, liquids/solids ratio and the curing mode, and find its suitable composition for paver blocks. Specific objectives To achieve the main objective, the research proposal includes ? To evaluate the strength properties of metakaolin – boiler ash (MK – BA) blend geopolymer binder under different curing conditions. ? To study the durability properties of metakaolin boiler ash (MK - BA) blend geopolymer binder under different environment such as acid resistance, sulphate resistance, chloride resistance and alternate wetting and drying resistance ? To determine the properties of BA-MK geopolymer concrete for paver blocks.	JEGATHEES WARAN D (CHOCKALIN GAM TRUST)	871477.04	Not Recommended Project does not meet any of the thrust areas of research in mines and is related geopolymer concrete
172	SNTMO M/176/2020	Development of Green Construction Materials from Industrial Wastes (Red Mud and Phosphogypsum) for Structural Applications (Duration: 3 Yrs, 0 Mth)	• Amend red mud (RM) and phosphogypsum (PG) in appropriate proportions until such combination produces environmentally acceptable green material with pH acceptable limit of less than 8.0. • Propose a new design mix methodology for the combined use of RM and PG to develop composite materials for structural applications including buildings and pavements • Demonstrate a methodology or process of manufacturing green construction materials. • Evaluate the mechanical and durability characteristics of developed composite materials, as per the guidelines of relevant building and pavements standards. • Identify a suitable binder additive(s) that would enhance the fresh, strength and durability properties of developed materials and verify its performance for different environmental conditions • Evaluate the pH dependent leaching characteristics of developed products for potentially toxic elements and environmental acceptability.	B. Hanumantha Rao (Indian Institute of Technology Bhubaneswar)	4846602.00	Not Recommended Project is not the thrust area of MoM as it relates to developing a green construction material from industrial waste.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
173	SNTMO M/177/2020	Bioremediation of Acid Mine Drainage using Bioelectrochemical Systems coupled with Biosynthesis of Iron nanoparticles (Duration: 3 Yrs, 0 Mth)	• Investigation and demonstration of the performance of bioelectrochemical system (BES) for treatment of acid mine drainage (AMD) • Removal of different toxic metals contained in AMD and exploring possibility of recovering them. • Use of the excess sulphide produced in the cathodic chamber for synthesizing nanoparticles and metal nanocomposites using microorganisms.	Pritha Bhattacharya (Indian Institute of Technology Hyderabad)	4748800.00	Not Recommended Project does not meet any of the thrust areas of research in mines as it relates to bioremediation of acid mine drainage
174	SNTMO M/178/2020	DETECTION, PREVENTION AND REPAIR OF SUB SURFACE CORROSION IN OVER HEAD LINES SUPPORTS ,ANCHORS AND FOUNDATIONS (Duration: 3 Yrs, 0 Mth)	Overhead Lines are important structures constructed for transmitting electrical power across the country and to other countries around the world.Sub Surface corrosion is one of the major causes for failure/collapse of vital structures. This results in power outages affecting the economy to a larger extent. The objectives of the research proposal are: o To explore the causes for surface corrosion and to review the Detection, Prevention and Repair of OHL Supports, Anchors and Foundations (DPROSAF) o To study the corrosion phenomena just 1m above the soil surface and below the ground level of such structures and to derive repair methodologies suiting different environmental and loading conditions o To establish a world class DPRSOAF Centre for Excellence which will serve as a facility to suggest a suitable protective methodology to OHL supports, anchors and foundations in the country and to other countries as well.	S.CHRISTIAN JOHNSON (ERODE SENGUNTHAR EDUCATIONAL TRUST)	31134641.07	Not Recommended Not in the mandate of Ministry of Mines as it relates to corrosion of overhead lines, supports etc.
175	SNTMO M/179/2020	D-Spectre - Mineralogical analysis of ores or mining wastes using hyperspectral image processing (Duration: 3 Yrs, 0 Mth)	The aim of the project is to develop tools for mineralogical assessment of the mines using hyperspectral images analysis captured through satellites. To reach this objective, it is important to develop algorithms analysing the images and their dependence on the factors (distances, atmospheric conditions, topography and ore type). For this study, the hyperspectral images will be captured through drone. The specific objectives are: 1) Developing data set of hyperspectral images of different ores (feldspar and dolomite) in different conditions. 2) Curating and Annotating the data for training neural networks. 3) Optimizing architectures and algorithms for generating feature embeddings and for classification of ore. 4) Fine tuning of architectures and algorithms for introducing invariance to environmental conditions and imaging device parameters. 5) The architectures will be validated on satellite data. Requisite modifications to adapt from drone data to satellite data will be done.	T R Sreekrishnan (Indian Institute of Technology Delhi)	6017616.00	Recommended New and upcoming concept.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
176	SNTMO M/180/2020	Coal derived carbon based sulfur composite cathode for room temperature sodium sulfur rechargeable batteries (Duration: 3 Yrs, 0 Mth)	Present project is aimed at developing bituminous coal-derived porous carbon for surface modification of sulfur cathode for preparing sulfur-carbon composite cathode for room temperature (RT) sodium-sulfur (Na-S) battery and overcome its general shortcomings such as low electronic conductivity of S and shuttle effect. Objectives: To obtain porous carbon from bituminous coal to prepare carbon-sulfur composite cathode for Na-S battery. To develop room temp. Na-S battery by using developed cathode material and its characterization. BET characterization of the porous carbon for porosity and pore parameter determination. Characterization of C and S-C composite using XRD, SEM, TEM, RAMAN, XPS, and electrochemical tools. Surface modification of cathode material by coating it with bituminous coal (obtained from Jharia, Corba, and Singrauli mines) derived porous carbon in order to limit the side reaction at the interface and value addition to the bituminous coal available in Indian mines	Rajendra Kumar Singh (Banaras Hindu University)	4005356.00	Not Recommended Not mandate of the Ministry of Mines.
177	SNTMO M/181/2020	Investigation and generation of spectral library of major minerals in West Bengal using Hyperspectral Remote Sensing (Duration: 3 Yrs, 0 Mth)	• Generation of Spectral Library for major minerals in Indian scenario using field investigation and space borne technology. • Satellite data Analysis for Lithological discrimination over the study area. • Mineral Mapping by integrating space borne data and field collected spectral data.	Shivangi Somvanshi (Amity University Uttar Pradesh Noida Campus)	9539650.00	Not Recommended Similar kind of work is being carried out by GSI
178	SNTMO M/182/2020	Development of FCC and BCC based high entropy ceramic alloys for mining tool application (Duration: 3 Yrs, 0 Mth)	High entropy ceramics attracts lot of interests and displays desirable structural properties. The purpose of the present proposal is to develop a high entropy ceramics using novel alloy design and nanostructuring approach for the mining tool application. For this purpose, series of CoCrFeMnNi high entropy alloys would be used as a face centered cubic phase model system. The series of refractory TiTaNbZrHf high entropy alloys would be used as a body centered cubic phase model system. Two approaches would be implemented namely, alloy design and nanostructuring. In the alloy design approach, the interstitial carbon or boron would be added in the system in order achieve high hardness and further processing of alloys would be carried out using hot multiaxial forging to produce nanostructure microstructure and enhance the structural properties. Finally, tailoring the properties through controlled heat treatments in order to produce these newly developed HECs for mining tool application.	Dan Sathiaraj (Indian Institute of Technology Indore)	2773500.00	Not Recommended Very general in nature (theoretical in nature) Product to be identified Not focused

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
179	SNTMO M/183/2020	Recovery of metallic values from bauxite residue -red mud (Duration: 2 Yrs, 0 Mth)	The proposal aims to utilize red mud, reduce industrial liability and generate alternative source and is in line with sustainable utilization initiatives like 'waste to wealth.' The overall objectives of this project are proposed as follows: 1. Develop a pre-treatment process for removal of caustic values of the red mud. 2. Separation of interlocked minerals and generate concentrate possessing economic value. 3. Development of processing route for the valorization of the red mud with minimal waste generation. 4. Development of thermal microwave heating and acid baking for processing of selective separation of the valuable contents. 5. Development of liquid-liquid extraction route for separation of metals using different extractants. 6. Process comparison for product recovery, environmental impact, life cycle assessment, and economic considerations.	NIKHIL DHAWAN (Indian Institute of Technology Roorkee)	3151000.00	Not Recommended No novelty
180	SNTMO M/184/2020	Rapid approach technologies for recovery of rare earth elements from secondary resources (Duration: 3 Yrs, 0 Mth)	1. Characterization of rare earth elements in secondary resources (red mud, coal ash, etc) 2. Pre concentrate the rare earth elements from secondary resources with suitable separation methods, 3. Leaching studies with commercially available mineral acid like HCl, H2SO4, HNO3, etc., 4. Optimization of leaching process for further solvent extraction process with the support of modelling and simulation studies , 5. Establishment of the laboratory scale solvent extraction process with the commercially available solvents like TBP, DEHPA, PC88A, etc., 6. Modeling and simulation studies for optimum design of the efficient solvent extraction process , 7. Solvent extraction process development for the extraction of individual rare earths elements, 8. Development of process flow sheet with material balance.	Dhani Babu Talakala (CSIR National Institute for Interdisciplinary Sciecnce and Technology)	2935800.00	Recommended Concept is well defined. Potential for REE from secondary resources
181	SNTMO M/185/2020	Design and Development of Intelligent System for Air Pollution Supervision using Industrial Internet of Things and Deep Learning (Duration: 3 Yrs, 0 Mth)	The detailed objectives of this proposed project are as follows: ?? Integrate and Build Industrial Internet of Things model for air pollution monitoring and controlling form multi sensors. ?? Design and Develop an intelligent aid for people working in dust mining areas which will help them to overcome from air pollution diseases. ?? Design and development of novel feature selection approaches for selecting the features from multiple sensors. Perform Exploratory Data Analysis (EDA) techniques to analyze prepared data which will summarize their main characteristics. ?? Build deep learning models from evolutionary algorithms for prediction of Air Pollution Index values for identification of pollutants in atmosphere.	D V ASHOKA (JSS MAHAVIDYA PEETHA)	1318907.88	Not Recommended Proposed outcome non-specific for mining industry.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
182	SNTMO M/186/2020	Battery Operated 200 kW Dual Motor Drives for Surface Mining Electric Vehicles Design with On-board Smart Charger and Safety Considerations (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Design of a 200 kW, 1200 V dc, efficiency of 97%, power density greater than 25 kW/L with 115 degrees centigrade coolant inverter with Silicon Carbide (SiC) for SMV. • Development of high performance control for dual motor drives based SMV and Load sharing and coordinated controlled design for smooth starting and continuous operation. • Mechanical design of complete SMV design with reduced planetary gear and air clutch mounting for testing for actual scenario of SMV. • A systematic design and development of smart fast charger and battery management system while simultaneously enabling electric energy savings. • An experimental prototype of complete dual IM drive will be developed to validate the proposed system. • A practical machine learning-based fault diagnosis and safety methodology will be developed for dual IM drive for SMV. 	Ranjan Kumar Behera (Indian Institute of Technology Patna)	8112400.00	Not Recommended Project outcome is not specific useful for industry.
183	SNTMO M/187/2020	Utilization of Copper Tailings as an Alternative Raw Material for Building Construction (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To understand the physico-chemical properties of copper tailings (CT) as a raw building material • To develop value-added building products and to determine the range of consumption of copper tailings for different applications using copper tailings • To develop various grades of mortar & concrete using copper tailing as satisfying the performance requirements for building construction including structural concrete • To study the durability of CT based building materials including corrosion resistance 	SukhdeoKarade (CSIR Central Building Research Institute)	7565000.00	Not Recommended This project does not meet any of the thrust areas of research in mines as it relates to alternate use of copper tailings in building material
184	SNTMO M/188/2020	Human body interaction with suffocated automobile interior in mining environment (Duration: 3 Yrs, 0 Mth)	<ol style="list-style-type: none"> 1. Numerical modelling of the flow field and temperature distribution within the cabin. 2. Numerical modelling to calculate solar load in the cabin. 3. To study the air circulation inside the compartment for efficient ventilation under parking in the mining environment. 4. Assessment of thermal comfort with a manikin. 5. To utilize the solar energy for HVAC requirement so that the engine shaft power can be saved. 6. Experimental validation of numerical and theoretical analysis in a typical mining environment. 7. Design or modification of car compartment for efficient movement of hot and cold air. 	Brajesh Tripathi (Rajasthan Technical University Kota)	6314420.00	Not Recommended Not thrust area of MoM as it is related to human comfort in machinery cabin.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
185	SNTMO M/189/2020	Characterization, Treatment and Utilization of Mining Waste in Hot and Cold Mix Asphalt (Duration: 3 Yrs, 0 Mth)	The major objective of the study includes characterization, treatment, and utilization of mining waste as aggregates in flexible pavement construction. Following sub-objectives will be achieved to complete the objectives of the project: 1. Characterization of the mining waste collected from mining sites. 2. Treatment of Mining waste to make it suitable for use in Hot Mix asphalt. 3. Studying the performance of Hot Mix Asphalt prepared using mining waste. 4. Studying the resilient modulus of Hot Mix Asphalt prepared using mining waste.	Bhupendra Singh (National Institute of Technology Patna)	15126754.00	Not Recommended This project does not meet any of the thrust areas of research in mines.
186	SNTMO M/190/2020	Fabrication of aluminium and Ag NPs based collagen nanocomposites and investigation of its therapeutic application in Diabetic wound healing (Duration: 3 Yrs, 0 Mth)	Objectives of the proposed study: 1. To synthesize Al ₂ O ₃ /AgNPs/Collagen/Cellulose device (Ag NPs encapsulated collagen matrix will be embedded on cellulose paper) and their characterization. 2. To investigate antibacterial, antibiofilm and possible molecular mechanism of Al ₂ O ₃ /AgNPs/collagen/cellulose device against pathogenic antibiotic resistant and non-resistant S. aureus and P. aeruginosa. 3. To check the activity of oxidative stress associated factors and expression of important genes will be evaluated using different molecular approaches. 4. To investigate biocompatibility of Al ₂ O ₃ /AgNPs/Collagen/Cellulose device under normal and hyperglycemia conditions towards mammalian cells followed by in vitro methods. 5. Al ₂ O ₃ /AgNPs/Collagen/Cellulose device will be used to evaluate the wound healing proficiency and elimination of infection caused by pathogenic bacteria in diabetic and non-diabetic mice (BL6 or BALB-c).	Amrita Mishra institute of industrial technology)	3983700.00	Not Recommended This project does not meet any of the thrust areas of research in mines as it relates to collagen composites for therapeutic application.
187	SNTMO M/191/2020	Recovery and Recycle of solid and liquid mine waste for casting Eco friendly bricks and other value added materials A study towards real time applications in Indian scenario (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To characterize the collected waste (solid, wastewater and tailings) from mine site, Neyveli, Tamil Nadu, India. • To prepare and decode the physical and mechanical properties of concrete blocks from mine waste • To study the feasibility in practical implementation of concrete blocks in identified sites and study its durability, leaching, and other properties as per Indian standards. • To recover valuable sulphate and rare earth materials from solid and liquid waste via adsorption and biological methods. • To perform techno economic feasibility of the overall process • To evaluate the prospects of implementing the research outcomes in an identified local community at vadakuthu, Neyveli with the focus of rural up development. 	Arun J (SATHYABAMA EDUCATIONAL TRUST)	4011700.00	Not Recommended Project does not meet thrust areas of research in mines as it relates to alternate use of solid and liquid mining waste in making bricks.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
188	SNTMO M/192/2020	Reclamation of bauxite residue (red mud) storage site through phytoremediation and biomass valorization (Duration: 3 Yrs, 0 Mth)	The overall objective is to carry out phytoremediation on a bauxite residue (red mud) storage area along with valorization of the contaminated biomass from the site. Specifically the objectives are: • Carry out pot trials with red mud to identify biomass with high tolerance and biomass valorization potential for field trial • Develop inhospitable red mud area into productive land through systematic and scientific phytoremediation techniques in 0.5 hectares in one of HINDALCO's site • Monitor the growth of biomass, soil improvement on site • Study the distribution and recovery of concentrated contaminants • Optimize hydrothermal conversion technology for biomass valorization chosen due to its effectiveness, suitability for small scale in situ operation • Characterize valorization products such as bio-oils, bio-char and estimate their upgradation requirement and application potential	Vidya S Batra (The Energy and Resources Institute)	9820760.00	Not Recommended No novelty.
189	SNTMO M/193/2020	Utilization of Mining Waste for the Green Production of Geopolymer based Building and Construction Materials- Experimental Studies, Modeling through Machine Learning and in-situ Applications (Duration: 3 Yrs, 0 Mth)	Mining waste mainly consists of rocks and mine tailing. Fly ash is basically an inorganic material consisting of aluminosilicate compounds. Construction and demolition wastes (CDWs) are generated during demolition of old structures for making new and modern buildings. While unscientific disposal of these wastes would harm the environment and the ecosystem, it is advisable to make use of them by reprocessing and recycling. Concrete is most popular and broadly consumed material in the building and construction works. Ordinary Portland cement (OPC) and sand are the primary ingredients to prepare concrete. Production of OPC requires huge amount of natural resources, demands huge quantity of energy and generates large quantity of green house gas, CO ₂ . The objective of this work is to develop an in-situ mechanism for the production sustainable construction material by using fly ash, mining waste and CDWs in order to reduce consumption of natural resources as well as the carbon foot print.	Jagannath Roy (Central University of South Bihar)	3552744.00	Not Recommended Project does not meet thrust areas of research in mines as it realtesgeopolymer for building and construction material.
190	SNTMO M/194/2020	Investigations (Petrography- Geochemistry) of carbonatites and alkaline rocks of the Sung Valley Complex, Meghayala, India with special reference to REE and Nb mineralisation (Duration: 3 Yrs, 0 Mth)	To carry out detailed fieldwork and systematic sampling for a systematic mineralogical, petrological and fluid inclusion study of samples suites from carbonatites and alkaline rocks of the Sung Valley complex. To undertake detailed major, trace and REE geochemistry and stable as well as radiogenic isotope signatures of the selected samples in relation to economic mineralization. To establish the mineral and fluid paragenesis and paragenetic sequence for the REE and Nb- mineralization.	Arundhuti Ghatak (Indian Institute of Science Education and Research Bhopal)	4995650.00	Recommended Potential for REEs

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
191	SNTMO M/195/2020	Development of cost-effective electroplated NiGd and NiMo nano structured coatings as protective layers for mining instruments. (Duration: 3 Yrs, 0 Mth)	I. Ni-Gd and Ni-Mo alloys will be synthesized by electrodeposition on the specified substrate at different plating conditions such as bath temperature, plating time, concentration of electrolyte, current density etc.. II. The surface morphology and chemical composition of the prepared thin layers will be investigated by Scanning Electron Microscopy (SEM), Energy-dispersive spectrometry (EDAX), Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM) and X-ray diffraction (XRD). III. The mechanical properties like Adhesion, hardness, surface roughness, wear analysis, erosion and corrosion resistance of coated thin layers will be investigated. IV. To establish the electrochemical work station set up facility; this would enable us to measure the polarization and corrosion resistance of the coated Ni-Gd and Ni-Mo thin films.	R. Kannan (RAMANAND HA ADIGALAR FOUNDATION)	4340500.00	Not Recommended Project related to machinery coating, which is not thrust area of MOM.
192	SNTMO M/196/2020	Design and Development of Hearing Protection Device based on Biologically-inspired Signal Processing Models to Mitigate the Problems of Noise-Induced Hearing Loss for Mining Workers. (Duration: 3 Yrs, 0 Mth)	i) To set up real-time acoustic sensors for acquisition of high-level ambient noise at the Copper Mineralization Industry Complex. ii) To investigate the ambient noise profile and its characteristic features using signal processing tools and transforms. iii) To study and understand the relative degradation in the neural responses due to the ambient noise using the biologically realistic auditory-nerve model. iv) To develop an adaptive filtering-based algorithm and its prototype to minimize the neural degradation for controlling the noise level to prevent noise-induced hearing loss.	Anantha Krishna Chintanpalli (Birla Institute of Technology and Science Pilani)	3957950.00	Not Recommended Project not mandate of MoM as it relates to Hearing protection devices due to sound.
193	SNTMO M/197/2020	Nanoparticles-Aided Treatment of AMD and Development of Cemented Paste Backfill for Supporting Underground Stopes using Mill Tailings Impoundment (Duration: 3 Yrs, 0 Mth)	1: Development of a pilot-scale AMD treatment unit for recycling and reuse of the AMD 2: Development of mill tailing based paste as a backfill material with desired strength and deformability for supporting underground mine structures 3: Study the effect of supernatant from tailing pond on groundwater resources of the area	T G Sitharam (Indian Institute of Technology Guwahati)	83121532.00	Recommended Potential fortreatment of Acid Mine Drainage.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
194	SNTMO M/198/2020	Development of high performance Cu-Based ternary alloy for fin-tube resistance welding electrode (Duration: 3 Yrs, 0 Mth)	The following objectives are set for this research work: a) Development of a novel Cu-based ternary alloy by casting followed by suitable forming process. b) Evaluation of Mechanical and Tribological Properties of newly developed alloy. c) Comparative analysis with other welding electrode materials. d) Performance evaluation and life expectancy on Profile welding machine (In collaboration with Industry)	BhanudasDattatrayaBachchhav (All India Shri Shivaji Memorial Society)	2627250.00	Not Recommended Proof of concept and industry support missing
195	SNTMO M/199/2020	Thermo-mechanical Finite Element Modeling of Inter-granular and Trans granular Fracture in Polycrystalline Brittle Rock Under Dynamic Loading (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To formulate thermodynamically consistent coupled governing equations for brittle rock fracture • To develop finite element simulation framework for inter- and trans- granular fracture of rock • To validate the numerical scheme with wave propagation and evolution phase field crack • To generate polycrystalline rock microstructure with desired grain and orientation statistics • To simulate fragmentation for various rock microstructures under different impact velocity or blast pressure • To map rock fragmentation or fracture network statistics with microstructural parameters at different loading rates 	Siladitya Pal (Indian Institute of Technology Roorkee)	3395450.00	Not Recommended No novelty in the project.
196	SNTMO M/200/2020	Investigation into the response of cemented paste backfill to mining induced stresses (Duration: 1 Yrs, 0 Mth)	The main objective of this study is “Investigation into the response of cemented paste backfill to mining induced stresses” with respect stress changes within CPB with time and its response to mining induced stresses under Indian geo-mining conditions.	Prashant (CSIR Central Institute of Mining and Fuel Research)	6874150.00	Not Recommended No novelty in the project.
197	SNTMO M/202/2020	A Novel Eco-Friendly Process Development For Conversion of Waste ETP Sludge of Synthetic Rutile Plant Into TiO ₂ Based High Valued Functional Nanomaterials For Various Applications (Duration: 3 Yrs, 0 Mth)	1. Development of a low cost eco-friendly process for sustainable treatment and recovery of TiO ₂ from waste ETP sludge of minerals and metals industries. 2. Formulation development and green synthesis of high grade functional TiO ₂ -based nano-materials (i.e., different morphologies, high yield and surface area). 3. Synthesis and characterization of the TiO ₂ nano-materials by different analytical techniques (i.e., TEM, SEM, XRD, FTIR, BET, ICPMS etc.) 4. Feasibility analysis of developed functional TiO ₂ -nano-materials in various applications (i.e. wastewater treatment, electrode materials etc.).	Partha Kundu (CSIR National Institute for Interdisciplinary Sciece and Technology)	4555800.00	Not Recommended This project does not strictly meet the thrust areas of research in mines

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
198	SNTMO M/203/2020	Modeling and Simulation for optimizing the performance parameters of slurry flow in mining industries (Duration: 3 Yrs, 0 Mth)	(a) A hierarchical mathematical model of slurry flow will be developed for knowing insights of flow patterns in a pipe, (b) Build-up an experimental facility for finding the rheological characteristics of slurry, pressure drop, erosion rate, solid concentration distribution, and velocity profile at various volumetric concentrations. (c) To carry out the numerical simulation and validate the obtained outcomes with the experimental data at the different particulate size and volumetric concentrations. (d) Post-validation, the extensive parametric simulation will be carried with the help of the CFD tool for obtaining valuable results on particulate trajectories, pressure drop, solid concentration, velocity profile, and erosion rate for various types of slurries. (e) Optimize the parameter of effective and efficient slurry flow in various environmental conditions for the iron ore industries and cement industries.	Dr. Basant Singh Sikarwar (Amity University Uttar Pradesh Noida Campus)	4591800.00	Not Recommended Not recommended as project is related to slurry flow and is not the thrust area of MoM.
199	SNTMO M/204/2020	Energy saving Cold Sintering Process (CSP) for the development of dielectric molybdate-polymer composites (Duration: 3 Yrs, 0 Mth)	1. Cold Sintering Processing studies of double alkali molybdates and/or tungstates and alkali molybdate-polymer composites. To show that thermoplastic polymer powders with ceramic dielectrics can be co-sintered with CSP. 2. Structural and Microstructural analysis will be used to determine crystal phase distribution, structure, surface morphology and grain size distribution with XRD, SEM and TEM. 3. Here we anticipate the defect chemistry to be very different than the conventional sintered materials. To assess these differences, we will use electrical characterization methods to point to the differences. knowledge of dielectric properties of the materials will be crucial in order to find their suitability for microwave applications.	Seema Sharma (Anugrah Narayan College Patliputra University Patna)	4388502.00	Not Recommended Proposed outcome non-specific for mining industry.
200	SNTMO M/205/2020	Development of Integrated Process Flowsheet and Pilot-Scale Demonstration for Extraction of Value-Added Products from Coal Tailings (Duration: 3 Yrs, 0 Mth)	a) Development of an integrated process flowsheet for the extraction of low ash clean coal and its utilization in the preparation of value-added products. b) Utilization of low ash clean coal for coal-water-slurry-fuel application and combustion study at bench scale. Development of CFD models for better understanding of the coal-water slurry combustion and designing of an efficient burner. c) Production of high ash activated carbon from flotation tailing coal and their utilization in wastewater treatment. d) Pilot-scale demonstration (4 kg/ hr) of the developed products.	DebaprasadShee (Indian Institute of Technology Hyderabad)	19635310.00	Not Recommended Pertains to Ministry of Coal.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
201	SNTMO M/206/2020	Rock drilling using pulsed Bessel laser beam induced cavitation bubble and melting for mining applications (Duration: 3 Yrs, 0 Mth)	There are two primary objectives of this proposal. First, to investigate “whether a pulsed Bessel laser beam induced elongated cavitation bubble, generating high speed water jets, would have the capability to enhance the rock drilling process via spallation mechanism”. Further investigation would be carried out on the effect of “clustering of bubbles” in 1- and 2-dimension on rock drilling. The control over length, shape and arrangement of individual bubbles is the key towards enhanced drilling. The second objective of this proposal is to investigate “whether the combined effect of “prolonged water jetting” resulted from elongated bubble, and “laser ablation / melting” induced by Bessel beams in water would enhance the rock drilling efficiency”. Note that Bessel beams with elongated focal region can ablate / melt the rock material and simultaneously induce long bubble in water, depending on the relative position between Bessel beams and rocks such as limestone, sandstone and granite.	Manoj Kumar Bhuyan (CSIR Central Scientific Instruments Organisation)	6900740.00	Not Recommended No novelty in the project.
202	SNTMO M/207/2020	Economic production of in-situ Alumina-Silicon Carbide from wastes of coal mines for the manufacture of Functionally Graded Aluminium metal matrix composites (Duration: 3 Yrs, 0 Mth)	1. Manufacture a number of samples of in-situ Alumina-Silicon Carbide composite powder from colliery Shale (Colliery Mine’s waste). 2. Use these powders to manufacture Functionally Graded Aluminium Metal Matrix Composite. 3. Assessment of physico-mechanical properties of the above mentioned Aluminium based Functionally Graded Metal Matrix Composites. 4. Test its application in automotive and other related areas.	ARAVIND TRIPATHY (Balaram Panda Trust)	3784010.00	Not Recommended Project does not meet the thrust area of ministry of mines and pertains to Ministry of coal.
203	SNTMO M/208/2020	Design and Implementation of Multi-Object Detection and Tracking System for Mineral Exploration in Deep Sea (Duration: 3 Yrs, 0 Mth)	? This work tries to develop a new and efficient multi-object detection and tracking model using Deep Convolution Neural Network. ? The detection model is initially trained and tested by the use of Mask Region based Convolution neural network (Mask-RCNN). ? The proposed method can be used to track minerals, other species or objects in the videos captured by the sensor nodes in UWSN. ? The presented detection model can be tested using a set of benchmark underwater video sequences.	S.P. Balamurugan (Annamalai University)	2150800.00	Not Recommended Casual proposal Not focused Geberic in nature

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
204	SNTMO M/209/2020	Mapping and Characterization of carbonaceous gas shale deposits of Mizoram, Northeastern India Implication on hydrocarbon generation potentiality and resource assessment (Duration: 3 Yrs, 0 Mth)	The major objectives of this proposed project are- i) Study of geological controls for occurrence, deposition, and genesis of gas in Neogene shale deposits of Mizoram state northeastern India. ii) To find out the gas storage capacity of the organic and inorganic constituent of shale formations. iii) To establish relationships among the geological and geochemical parameters for a better understanding of the shale gas reservoir.	SUSHEEL KUMAR (Mizoram University)	7418976.00	Not Recommended Pertains to Ministry of MoPNG
205	SNTMO M/210/2020	Design of predictive maintenance system for mobile assets in underground mines using Artificial Intelligence and Internet of Things. (Duration: 3 Yrs, 0 Mth)	The objectives of the proposed project are: 1. Design of condition-based monitoring (CbM) in real-time using the IoT and Cloud Technologies. 2. Design of Predictive Maintenance (PdM) technology which includes, CbM, AI model and Data Analytics. 3. Design of strategies for Data collection and Preprocessing.	Tarachand Amgoth (Indian Institute of Technology ISM Dhanbad)	3733200.00	Recommended Project related to use of artificial intelligence techniques.
206	SNTMO M/211/2020	Urban Mining-Recovery of metals from electronic waste (Duration: 3 Yrs, 0 Mth)	This project is an effort towards Make in India and Atmanirbhar Bharat initiative of GoI. We aim to develop an indigenous process combining hydro and pyrometallurgy to recover metals from electronic waste. The specific objectives of the current proposal are as follows: 1. Investigate ways for separation of components from PCB and delamination of PCB by chemical methods 2. Separation of metallic components from non-metallic components using a laboratory scale induction furnace with potential of scaling to a pilot plant 3. Control of dust and off-gas during induction furnace melting operation 4. Separation of individual metals using various hydrometallurgical processes	Deepoo Kumar (Indian Insitute of Technology Bombay)	6946000.00	Not Recommended Similar kind of project was awarded by MoM to NFTDC

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
207	SNTMO M/212/2020	Developing of Green Biopolymer in mine tailings (Duration: 3 Yrs, 0 Mth)	The mining industry generates significant amounts of Mine Tailings (MT) every year. The MT is commonly disposed of in impoundments behind engineered earth and rock dams. In arid and semiarid areas such as the regions of the south-western United States, MT can become wind borne resulting in fugitive particulate emissions. The environmental impacts of fugitive dust include nuisance in urban areas, reduction in visibility along nearby roads or railways, and contamination of surface water, soils and air. Chemical suppressants are widely used to mitigate fugitive dust from MT. However, some of the chemical dust suppressants may have adverse impact on the environment and human health. Therefore, there is a need to develop an environmentally friendly and cost-effective technology for mitigation of MT dust. The attempt will made to study the feasibility of utilizing biopolymer to stabilize MT for dust mitigation and the bonding strength between MT particles with biopolymer concentration.	V. C. SATHISH GANDHI (University College of Engineering Nagercoil Anna University)	1808900.00	Not Recommended Project does not meet thrust areas of research in mines
208	SNTMO M/213/2020	Utilization of Copper Mine Waste for Enhanced Performance of Flexible Pavements (Duration: 3 Yrs, 0 Mth)	This study is aimed at investigating the suitability of copper tailing (as fine aggregate and fillers) in SMA and bituminous mixes, and analyzing their influence on the behavior of asphalt mastics and mixes. The primary objectives of this study are listed below. • Physical, morphological, and chemical characterization of copper tailing and stone dust. • Design and comparison of stone matrix asphalt utilizing copper tailing as fillers. • Design and comparison of dense graded asphalt mixes utilizing copper tailing as fine aggregates and fillers. • To determine the rheological properties of filler bitumen mastic prepared with different fillers and filler bitumen ratios. • To evaluate the structural performance of prepared dense graded and SMA mixes. • Design and construction of test section utilizing designed mixes and analyzing their short term performance. • To perform economical and life cycle cost analysis of prepared test sections.	Ankit Gupta (Indian Institute of Technology BHU Varanasi)	12356280.00	Not Recommended Project does not meet any of the thrust areas of research in mines
209	SNTMO M/214/2020	Risk assessment of whole-body vibration exposure in mining machineries and its preventive measures- An ergonomics study (Duration: 3 Yrs, 0 Mth)	These are the objectives of the project: 1. To measure the Whole-body vibration (WBV) and transmissibility of vibration from the equipment to the human body. 2. To study the effect of various postures on the exposure of vibration. 3. To analyze the effect of various types of material used to form the seat of equipment on the exposure of vibration. 4. To reduce the exposure of WBV to the operator	Tarun Verma (Indian Institute of Technology BHU Varanasi)	6625200.00	Not Recommended Project related to vibration due machineries which is not thrust area of MOM.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
210	SNTMO M/215/2020	Autonomous Vehicles for Mineral Mapping (Duration: 1 Yrs, 0 Mth)	To develop an autonomous system that assists the ground crew in identifying the location of minerals using Artificial Intelligence.	David Rathnaraj (SNR SONS CHARITABLE TRUST)	5891020.00	Recommended Interesting and upcoming Concept.
211	SNTMO M/216/2020	Study on Underground Excavation in Very Weak Rock Condition (Duration: 3 Yrs, 0 Mth)	Sensitivity studies The sensitivity studies aim to show the influence of the following factors on estimation of earth pressure: (i) Influence of ground water table, taking into account the surcharge load in non-homogeneous ground. (ii) Effect of excavation sequences and structural support type. (iii) Size of the cross-section and existence of central column; (iv) Overburden and shape of the opening. (v) Effect of different backfill material with different compaction level. Development of suitable model for analysis Suitable model will be developed for FEM analysis considering the actual ground conditions. Special attention will be given to the analysis of case-studies, in order to assess the global performance of the numerical model. Guidelines The studies performed will identify guidelines related to the analysis, design and excavation of underground mines.	ANIRBAN MANDAL (Visvesvaraya National Institute of Technology Nagpur)	2232500.00	Recommended Potential for improvement of excavation in weak rock conditions in Underground mine.
212	SNTMO M/217/2020	On-line performance monitoring of mining equipment (Duration: 3 Yrs, 0 Mth)	1. Improve visibility into process change without any financial implications by developing digital twin 2. Generate database for healthy and faulty state of the components 3. Apply data analytics to monitor performance of components 4. Develop an interface to all levels of operation for planning maintenance activity and improve process efficiency 5. Generate alert to avoid accident in routine operation and for safety of human being	Sudhir Dattatraya Agash (College of Engineering Pune)	14189250.00	Not Recommended Project related to maintainance of Machinaries which is not thrust area of Ministry of Mines.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
213	SNTMO M/218/2020	Identification and Indigenous Development of a Novel Material for Surface and Continuous Miners Cutter Picks. (Duration: 3 Yrs, 0 Mth)	The present study aims to develop a novel cutting material for maximizing the productivity of surface and underground coal mines. The following are the objectives of the present study: 1. Laboratory characterization of coal and the cutter pick material under static and dynamic (both compressive and tensile) loading conditions. 2. Development of a finite element numerical model for simulating the real field behavior of rock-tool interaction by using constitutive relations. 3. Development of linear cutting equipment to test the efficiency of cutter picks (being used in the field) in the laboratory. 4. Modification and indigenous synthesis of new cutter material with enhanced tool life and cutting capacity. 5. Laboratory testing of the new cutter material and field implementation of the cutting tool showcasing increased productivity.	Sunita Mishra (Indian Institute of Technology Kharagpur)	13043000.00	Not Recommended Project related to Machineries which is being used in Caol Mines. Pertains to Ministry of coal
214	SNTMO M/219/2020	Geobotanical Prospecting for Rare Earth Elements in Papaghni Sub-basin (Duration: 3 Yrs, 0 Mth)	1. GIS mapping of Papaghni sub-basin for distribution of hyperaccumulator and endemic plants for REE bioaccumulation 2. Chemical Analysis of soil and plant samples of (root, stem and leaf) samples of hyperaccumulator /endemic plants for the REE 3. Determining morphological, physiological and biochemical changes in selected hyperaccumulator/endemic plants growing in mining and non-mining areas 4. Phytoextraction of REE from selected hyperaccumulator/endemic plants	K.Raghu Babu (Yogi Vemana University)	4681000.00	Not Recommended Project is more of academic interest.
215	SNTMO M/220/2020	Nanoporous Organic Polymer for Size-Selective Recovery of Rare Earth Elements from Leachates of Waste Bauxite Residue (RED MUD). (Duration: 3 Yrs, 0 Mth)	We want to develop functionalized nanoporous polymer as solid sorbents for the efficient size-selective recovery of REEs, especially Sc, from primary mining sources as well as from leachates of waste bauxite residue (RM). We plan to develop these polymers through four different novel approaches with easy and facile synthesis routs from simply available starting materials. (i) Hyper-crosslinked cyclodextrin based porous polymer for selective recovery of REEs, especially Sc from industrial waste RM. (ii) Cyclodextrin or Pillar[n]arene based porous polymer with phosphite linkage in the skeleton fro REEs separation. (iii) Pillar[n]arene based porous polymers having a series of preorganized ligands for size-selective separation of REEs. (iv) Porous two-dimensional nanosheets as well as polymer through photopolymerization induced dimerization inside a host cavity by employing robust self-assembling host-guest complexation strategy for size-selective separation of REEs.	Amal Kumar Mandal (CSIR Central Salt and Marine Chemicals Research Institute)	6628004.00	Recommended Upcoming field for REEs recovery from red mud

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
216	SNTMO M/221/2020	Sustainable mining in North East India (Duration: 3 Yrs, 0 Mth)	Mapping of mine wastes from different mining locations of North-East (NE) India and its re-usability to make social, economic, environmental friendly and sustainable geo-materials. 2. Determine the physicochemical properties and internal structure of mine waste dumps using near surface geophysical methods for NEI. 3. Assessment of stability of existing waste dumps in Bapung coalfield of Jaintia hills and Makum coalfield of Assam. 4. Suggest ways and means to adapt to sustainable mining practices in NEI that would include concerns of Society, Ecology and Economy dimension for Inclusive growth in NE. 5. Developing AI enabled forewarning system towards impending failure of waste dumps in mining areas.	Abhishek Kumar (Indian Institute of Technology Guwahati)	30677849.60	Not Recommended Not mandate of Ministry of Mines.
217	SNTMO M/222/2020	A Novel Electric Insulator and Dielectrics in An Industrial Mining Waste especially Fly ash or Pond ash (Duration: 3 Yrs, 0 Mth)	1. To save the environment from pollution by utilizing the large quantity of industrial mining waste resources i.e., fly sh or pond ash 2. To replace porcelain based Insulator by industrial waste based novel electronic materials such as electric pool, which is cost effective. 3. To study the resistivity of electronic materials to establish cost effective and quality technology. 4. To study the dielectric behavior, loss tangent and break-down voltage of the Pond Ash based electronic materials. 5. To study mechanical performance (compressive strength, hardness, and wear resistance), thermal properties study (thermal shock and thermal expansion) and resistance behavior (acid resistance, based resistance, solvent resistance and resistance to oxidation) 6. To scale-up the fly ash or Pond Ash based electronic materials for electric pool.	MUKTIKANT A PANIGRAHI (North Orissa University)	3284500.00	Not Recommended This project does not meet the thrust area of ministry of mines as it relates to fly ash
218	SNTMO M/223/2020	Development of mechanically rechargeable zinc-air battery integrated with electrolyte flow system for electric vehicles (Duration: 3 Yrs, 0 Mth)	The primary objectives of the proposal are: 1. Design of mechanically rechargeable zinc-air battery integrated with electrolyte flow system to avoid passivation 2. Develop a 15 Ah, 24 V zinc-air battery pack with provision for ultrafast mechanical recharging, for at least 300 recharge cycles 3. Zinc electrochemical recycling technology	Aravind Kumar Chandiran (Indian Institute of Technology Madras)	12932500.00	Not Recommended Project is not thrust area of MoM.
219	SNTMO M/224/2020	Functional Materials for uranium extraction from mine tailings (Duration: 3 Yrs, 0 Mth)	• Synthesis and characterization of Functional Materials. • Optimization of U Affinity, uptake capacity and uptake kinetics from acidic aqueous solutions. • Application of Functional materials to the mine tailing for uranium extraction.	Shilpi Kushwaha (CSIR Central Salt and Marine Chemicals Research Institute)	2923002.00	Not Recommended Project does not meet the thrust area of ministry of mines as it realtestoUranium

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
220	SNTMO M/225/2020	Preparation of Hadfield Steel from lean-grade Manganese Ores (Duration: 2 Yrs, 0 Mth)	(i) Chemical and mineralogical characterisation of lean-grade manganese ores (ii) Manganese enrichment present in the lean-grade ore by pyro-metallurgical techniques complemented by wet magnetic separation (iii) Smelting reduction of enriched manganese concentrate in arc furnace (plasma furnace and other furnace could be compared too) (iv) Physico-chemical characterisation of the product (pig iron and ferromanganese) and slag (v) Process parameters' optimisation (vi) Steel making in high-vacuum induction furnace (with a possibility to compare steel making in other type of vacuum furnace and comparison study) (vi) Physico-chemical characterisation of prepared Hadfield steel (vii) Mechanical property testing and assessment of prepared Hadfield steel (viii) Optimisation of steel making process parameters (ix) Development of the complete process flowsheet	Pravas Ranjan Behera (CSIR Institute of Minerals and Materials Technology)	3001400.00	Not Recommended General in nature No novelty
221	SNTMO M/226/2020	Proximity Detection System for Continuous Mining Machines (Duration: 3 Yrs, 0 Mth)	The objective of our proposed system is to perform real time tracking, sensing and management system using infrared image capturing, identification and tracking of human beings through object recognition by using Sensors and wireless networks. This will enable the mine management to improve both object visibility and environment visibility of a mine through real-time tracking and monitoring of enterprise objects using the Internet. It also allows controlling the objects and the environment by triggering actuators, which are also part of the enterprise objects.	Deepa Parasar (RitnandBalved Education Foundation)	6723300.00	Not Recommended Not thrust area and mandate of MoM.
222	SNTMO M/227/2020	1. Development of Graphite, Graphene oxide, reduced Graphene oxide from Biomass- An Alternative Resource Generation for Natural Graphite (Duration: 3 Yrs, 0 Mth)	. To produce graphite from biomass by thermal treatment with organic additives • Comparison of biomass-derived graphite with natural graphite available in India by using different characterization techniques • Feasibility study to scale up the process to make graphite from biomass • To convert biomass-derived graphite into graphene oxide (GO) and reduced graphene oxide (rGO) to improve the economic value.	R SAKTHIVEL (CSIR Institute of Minerals and Materials Technology)	8228076.00	Not Recommended Project does not meet the thrust area of ministry of mines as it relates to development of graphite, grapheme oxide from Biomass.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
223	SNTMO M/228/2020	An innovative and efficient IoT based approach of coal mine environmental monitoring for security aspects (Duration: 3 Yrs, 0 Mth)	The objective of this project is to create a network inside coal mines using wireless sensor network/wireless multimedia sensor network (WSN/WMSN) and Internet of things (IOT). This will electronically monitor, detect and update information about the abnormality condition of the subsurface atmosphere throughout the underground mine. Sensor nodes will be deployed and a network will be created throughout the mine to identify the places of gas leakage and land slip with precision. Upon sensing the place of abnormality the location and image of the place will be communicated to the IOT server and to all the workers related to the mine. The multimedia monitoring on demand will work in accordance with the area that is affected. In addition there is a concept of indoor localization which will detect the location of a worker who goes underground due to mining and suffers from hazardous condition. It will allow accessing the rescue team promptly for any casualty faced by any workers.	Rajib Banerjee (DR B C ROY ENGINEERING COLLEGE)	4575323.40	Not Recommended Pertains to Ministry of Coal
224	SNTMO M/230/2020	Extraction and isolation of Al, K, Li, Rb and Cs from Mica (Duration: 2 Yrs, 0 Mth)	• Development of process flowsheet for the extraction of Al, K, Li, Cs and Rb from Mica • Isolation of individual elements	Barsha Dash (CSIR Institute of Minerals and Materials Technology)	3013000.00	Recommended Concept of products for different user industry from single source
225	SNTMO M/231/2020	Characterization and Process Development for Recovery of REE from Indian Primary Resources (Duration: 3 Yrs, 0 Mth)	The following are the objectives of the study proposed 1) Development of process for enrichment of REE content in Indian primary ore resources other than beach sand by physical beneficiation 2) Development of process for recovery of REE from the enriched Indian primary ore	ALOK TRIPATHY (CSIR Institute of Minerals and Materials Technology)	8729000.00	Recommended Objectives are novel. REE potential

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
226	SNTMO M/232/2020	Petrological and Geochemical Investigations for Targeting Rare Earth Minerals and Rare Metals Mineralization in the Carbonatites from selected localities in India (Duration: 3 Yrs, 0 Mth)	(1) To investigate and document the carbonatite-alkaline and ultrapotassic rocks within the proposed carbonatite shown in Fig 1. (2) To generate major, minor and trace elements geochemical data of each areas and correlate these rocks in space and time with each other based on their, (a) Field relationships, (b) Petrographic characteristics, (c) Geochemical signatures, and (d) Isotopic ratios. (3) To carryout field and laboratory investigations for the Rare Earths (REE)-Rare Metals (Nb-Ta) mineralization in the proposed carbonatite localities. (4) To study the nature (whether true magmatic carbonatites or not), genesis (deep-seated mantle origin to shallow carbothermal residua), and tectonic history (based on geochemical and other characteristics) of the selected carbonatite localities.	KIRTIKUMAR RAMKRUSHNA RANDIVE (Rashtrasant Tukadoji Maharaj Nagpur University)	10084000.00	Recommended Project is well defined and has future potential.
227	SNTMO M/233/2020	Next Generation Programmable Swarm Micro Robots and Artificial Intelligence Enhanced Rational Decision Support Systems for Mining Automation (Duration: 3 Yrs, 0 Mth)	•To identify the different minerals of Lithium, Cobalt, Gold, Nickel, Manganese, Copper, Silver, Aluminium and Magnesium in real time data collection using the Programmable Swarm Micro Robots (PSMR). •To extract the features of rock face inspection, surface, temperature, gases, ore colour, humidity with the help of Improved Particle Swarm Optimization (IPSO) algorithm. •To collect the features from the programmable swarm robots a correct decision making algorithm is used. Improved Principal Component Analysis (IPCA) is used to minimize the redundant data retrieved from the programmable swarm robots. This will increase the processing speed and a quick decision gives better results to the Government as well as the mining owners.	SenthamilSelvi Marudavelu (SNR SONS CHARITABLE TRUST)	4228921.21	Not Recommended Project repeated. Already exists at SI. No.92(SNTMOM/96/2020)
228	SNTMO M/234/2020	Development of Process for Making High Pure Quartz or Silica and Metallic Silicon from Low Grade Naturally Occurring Quartz (Duration: 3 Yrs, 0 Mth)	The following are the objectives of the study proposed 1) Development of cost effective process for preparing high purity quartz or silica from naturally occurring low grade quartz 2) Development of cost effective process for making metallic silicon (Si) from high purity quartz	ALOK TRIPATHY (CSIR Institute of Minerals and Materials Technology)	8081000.00	Recommended Project has clear enunciation of objectives and deliverable in the proposal with high potential of utility.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
229	SNTMO M/235/2020	Development of Artificial Construction Sand using Bauxite Residue and Waste Marble Powder conforming to IS 383 2016 (Duration: 2 Yrs, 6 Mth)	Construction activities are known for depletion of largest amounts of natural resources. At the same time, mining and metal refining industries are facing the problem of safe disposal of wastes. This project aims to address multifaceted problems, of wastes generated during marble mining, bauxite refining, and sustainability of construction sand. The objectives are: 1. To produce artificial construction sand as per IS 383: 2016 using red mud and marble powder. 2. To evaluate the engineering and durability properties of concrete prepared using artificial sand in comparison with control mixes. 3. To study the environmental suitability and microstructural properties of concrete prepared using artificial sand in comparison with control mixes.	Bhavna Tripathi (MANIPAL UNIVERSITY JAIPUR)	9515903.00	Not Recommended Pls refer project SNTMOM/91/2020
230	SNTMO M/236/2020	Uranyl ion Concentration by Immobilized Nanomaterials (Duration: 3 Yrs, 0 Mth)	Sequestration and concentration of uranyl ions from seawater using different organic nano sorbents. The project will focus on three deliverables; 1. Design and synthesis of (a) organically-modified silica gel (ORMOSILS)-based nano-sorbents, (b) nano metal organic frameworks (nMOFs) based sorbent and (c) peptide-based nano sorbents 2. Quantitation of recoveries. 3. Scale-up for transfer to a suitable industry/ government agency.	Gurunath Ramanathan (Indian Institute of Technology Kanpur)	9331000.00	Not Recommended Project does not meet the thrust area of MOM as it relates to concentration of uranyl ion from sea water.
231	SNTMO M/237/2020	REE mineralization in migmatites and younger intrusive rocks in Sonbhadra District, Uttar Pradesh- Ore genesis and exploration significance (Duration: 3 Yrs, 0 Mth)	To take extensive surface traverses, map mineralized/hydrothermally altered zones, detailed structural studies at appropriate places and establish controls on mineralization with regional-scale deformation To establish alteration mineral paragenesis, quantifying the alteration by mineral-fluid equilibria and mass balance calculations To carry out phase petrological studies on host rocks, construct metamorphic P-T-t paths and pertinent petrogenetic grids/PT-pseudosections To undertake systematic petrographic-geochemical studies across the alteration zones, geochemical evolution of host rocks, and integrating additional information on petrogenesis and tectonic evolution To characterize the melt and ore fluid compositions, by inclusion petrography, microthermometry, and Raman spectroscopy To propose a coherent ore genetic model with crustal evolution for REE mineralization in Sonbhadra area with emphasis identifying potential mineralized zones with suitable exploration strategies	Sakthi Saravanan Chinnasamy (Indian Institute of Technology Bombay)	2362500.00	Recommended Potential for REE

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
232	SNTMO M/238/2020	Mineralogical and Petrographical characterisation of alkaline rocks of Western Odisha with special reference to REE potential (Duration: 3 Yrs, 0 Mth)	i. To establish mineralogy and textural characteristics of RE minerals and associated phases of syenite body ii. To study the amenability towards physical beneficiation for generating RE concentrate.	Sasmita Prusty (CSIR Institute of Minerals and Materials Technology)	2491000.00	Not Recommended Generic in nature No novelty
233	SNTMO M/239/2020	Crack Determination in Mines using Acoustic Emission Analysis (Duration: 3 Yrs, 9 Mth)	1. To develop an efficient acoustic signal processing algorithm for crack detection and damage prediction. 2. To develop hardware model of the algorithm for low cost and economic prediction.	Charu (UTHAN EDUCATIONAL TRUST)	3852750.00	Not Recommended No novelty in the project.
234	SNTMO M/240/2020	FABRICATION OF FLY ASH BASED PERVIOUS MATERIAL FOR WATER MANAGEMENT IN PILOT SCALE (Duration: 2 Yrs, 6 Mth)	? Maximum Utility of fly ash generated from Aluminium Company ? Establishment of a pilot plant for manufacturing the pellets ? Setting up of the slag, tile, brick and blocks for installation ? Optimization and Up-gradation of the Technology ? Construction of small walking path which can bear a minimal load ? Fabrication of the porous pervious material for water management	BISWA BANDITA KAR ()	25410060.00	Not Recommended Project does not meet the thrust area of ministry of mines as it relates to fly ash.
235	SNTMO M/241/2020	MINE FILLS AND ITS IMPACT ON SOIL MORPHO-DYNAMICITY AND SUSTAINABLE DEVELOPMENTS (Duration: 3 Yrs, 0 Mth)	The main objectives are: 1. Physical, Chemical, Mechanical and Engineering property estimation of the soil and soil impregnated fly ash. 2. Process simulation and optimization. 3. Estimation of soil morpho-dynamicity before and after mixing of fly ash. 4. Remedial measures to cease the impact of fly ash on soil property changes.	BISWA BANDITA KAR ()	18595400.00	Not Recommended Project related to soil & fly ash.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
236	SNTMO M/242/2020	AGGLOMERATION OF IRON ORE FINES USING BIOMASS FOR BLAST FURNACE IRON MAKING (Duration: 3 Yrs, 0 Mth)	As per Indian Minerals yearbook 2017, published in March 2018; total iron ore production in India is 158.108 million tonnes of which 34.54% is lump ore and 64.77% fines. The total cost of these fines is around Rs.12248.90 crores. Therefore, the 1st objective of the present proposal is to the utilization of iron ore fines and its conversion into agglomerated mass through pelletization& sintering for blast furnace use. Iron ore sintering is an energy-intensive process that converts iron ore fines into an agglomerated porous mass. The energy required for heating and the reduction in metallurgical operations has been traditionally provided by coke. In recent years, various policies and regulations made by the environmental protection agencies, have restricted usage of coal/coke in the sintering process. And the 2nd objective is to identify the applicability of biomass for metallurgical sintering and partial/complete replacement of coke breeze.	SHATRUGHAN SOREN (Indian Institute of Technology ISM Dhanbad)	3948500.00	Not Recommended Similar research has been carried out by various researches world-wide but technology has not found acceptance by the industry so far
237	SNTMO M/243/2020	Design and Development of a Compact, High Power Density Bearingless Motor for Conveyers in Mines (Duration: 3 Yrs, 0 Mth)	1. Design and development of torque and radial force windings 2. Design and development of robust controller 3. Control of eccentric rotor movement 4. Development of prototype of bearingless induction motor for conveyor applications in mines	Mrunal Deshpande (SSN TRUST)	2942950.00	Not Recommended Project does not meet the thrust area of MoM as it relates development of bearingless motor for conveyors.
238	SNTMO M/244/2020	IoT based Exploration of Mineral contents from soil, rock and Characterization using Machine Learning (Duration: 3 Yrs, 0 Mth)	Cost reduction The proposed work mainly concentrates on the reduction of cost involved in the mineral exploration. A machine learning model will support to keep finding of minerals with existing characteristics, when the same characteristics of samples are feed as input, the model will generate the result very quickly. So, this system will ease the process as well as reduce time. Developing an Exploration model The exploration model will be developed to find the availability of minerals from the sample soil/rock. The system will also generate the survey report on geological surface with less effort. Designing a Classification model The classification model is used to discover the minerals on land using the emerging information technologies such as IoT and Machine Learning. The classification model will help to characterize the minerals. The proposed generic model upon implementation can be reused for discovering the other minerals from various lands.	KANAGARAJ K (MSECSVKS)	2716380.00	Not Recommended Not focused No clarity on discrete geophysical properties

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
239	SNTMO M/245/2020	Reclamation of industrially useful oxides of Al and Mg from aluminium dross (industrial waste) and demonstration of its utility as a refractory and coating (Duration: 2 Yrs, 0 Mth)	Collaborative project (1) CHRIST University, (2) CSIR-National Aerospace laboratories (NAL), (3) Carborundum Universal Ltd (Murugappa Industries) for product development comprised of refractories and coatings from Al dross with following objectives 1. Demonstration of Al dross treatment technology to extract useful oxides of Al and Mg from black Al dross 2. Synthesis of sintered refractories from treated Al dross 3. Synthesis of plasma sprayable powder from treated Al dross 4. Plasma spray coatings from treated Al dross: 5. Materials characterization of sintered refractories and coatings synthesized from treated dross 6. Process parameter optimization: 7. Proof of application potential 8. Lab scale Proof of concept is already developed by CHRIST. Now, Proof of concept to utilize Al dross in industrial scale for product development and value-addition aspects to be confirmed .	Parvati Ramaswamy (Christ University)	4894876.00	Not Recommended Project not mandate of MoM
240	SNTMO M/246/2020	Stability and Safety Assessment of Mines under Non-Uniform Thermal Stress Field Induced during Accidental Open Fire- Experimental and Numerical Insights (Duration: 3 Yrs, 0 Mth)	i) To investigate the effect of non-uniform thermal stress field generated due to accidental open fire on the macro/micro scale mechanical properties of rocks. Spatial variation in the properties will be investigated with the change of distance of the rock samples from the open fire accident location by varying open fire source, rock types and duration of open fire. ii) To develop mathematical models, modelling spatial variation of mechanical properties of the rock with the distance from the open fire source based on the experimental results. iii) To develop an advanced numerical FEM based methodology capable of considering this spatial variation in rock properties due to accidental open fires while analysing updated mine stability post an open fire accident iv) To develop design charts for preliminary stability assessment of the mines subjected to the open fire accidents based on the developed numerical methodology.	Gaurav Tiwari (Indian Institute of Technology Kanpur)	4100400.00	Not Recommended Not mandate and thrust area of MoM

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
241	SNTMO M/247/2020	Electrochemical Recycling of Phosphorous from the Phosphate Minerals and Industrial Wastes (Duration: 3 Yrs, 0 Mth)	Phosphorus is not only an essential element for biomolecules such as DNA, RNA, and ATP, also a crucial component of industrially demanding chemicals. A good example is use of inorganic phosphates (PO ₄) ₃ - in fertilizer, detergent and pharmaceutical goods production. Besides that, organophosphorus compounds (e.g., organophosphines, R ₃ P and phosphites, (R'O) ₃ P) are inevitably used as ligands in metal-mediated as well as metal-free organo-catalysts. However, increasing consumption of phosphorus leads to a rapid depletion and urgently requires a regeneration scheme. In this context, recycling of phosphorus via reductive transformation of earth abundant phosphate minerals and organophosphine oxide industrial wastes into their valuable counterparts will be a sustainable approach to drop the global phosphorous demand. In this direction, electrochemical deoxygenation of P(V)-oxo compounds to phosphine or value-added products will be a viable alternate to the energy intensive chemical routes.	Biswarup Chakraborty (Indian Institute of Technology Delhi)	3890000.00	Not Recommended Project does not meet the thrust area under mom and also does not have clarity.
242	SNTMO M/248/2020	Self-reliant technology to produce high economic value products from natural graphite (Duration: 3 Yrs, 0 Mth)	1. To develop process know-how for the production of high economic value Graphene, Few layer graphene (FLG), Graphene oxide(GO) and reduced graphene oxide (rGO) from various grades of natural graphite by beneficiation and economically viable exfoliation. 2. Techno-economic feasibility study intended to scale up the process	Balaji Umaphathi (CSIR Institute of Minerals and Materials Technology)	8026076.00	Recommended Project has proof of concept and industry support letter with potential of output useful to MSME.
243	SNTMO M/249/2020	Technology Development to Improve Silver Recovery from Lead Zinc Ore at Zawar Mines (Duration: 3 Yrs, 0 Mth)	1. To improve yield of native silver from ore of Baroi Mines 2. Recovery of silver from the trailing of froth floatation process. 3. Evolution of strategy to recover silver that remains associated with sphalerite; will be done with depressor for sphalerite and suitable frother and collector for silver mineral. 4. Design of a process strategy for employment of hydrometallurgy to maximise silver recovery amidst extraction of Pb, Zn and Cu; shall be done if chalcopyrite is in appreciable amount with the galena and ZnS. This is not too uncommon in India. 5. Use of bioleaching to enhance silver recovery 6. Overall enhancement of silver recovery by 50% so that HZL is envisioned for large scale implementation of silver liberation plan.	Amar Patnaik (Malaviya National Institute of Technology Jaipur)	22255252.00	Recommended Project meets the thrust area under- Improve efficiency in process, operations. Industry participation and funding support is assured. The project outcome if positive has huge benefit to the industry

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
244	SNTMO M/250/2020	Recovery of Germanium from Fly Ash (Duration: 3 Yrs, 0 Mth)	1. Identification of fly ash resources with germanium. 2. Leaching of germanium from fly ash using organic leachants/complexants. 3. Purification of germanium compounds using impregnated indigenous ion-exchange resins. 4. Conversion of pure germanium compounds to germanium oxide.	Benadict Rakesh (CSIR Institute of Minerals and Materials Technology)	4775500.00	Not Recommended Project does not meet the thrust area under MoM as it relates to Fly ash
245	SNTMO M/251/2020	CBM Resource Assessment, Feasibility Study ,3D Integrated Reservoir Modelling approach, and Selection of the optimum development strategy from an Environmental and Sustainable Mining Perspective (Duration: 3 Yrs, 0 Mth)	The proposed study aims to achieve the following objectives for the potential CBM area of Jharia Coalfield: • Study the potential of coal bed methane (CBM) opportunity, acquire data from the virgin area through drilling two exploratory coreholes, study and analyze the acquired core data, logging and well testing data, integrate the analyzed data into a 3D full-field coal reservoir model, and use a reservoir simulation model to optimize drainage system design and assess the relative benefits of degasification alternatives. • Perform geomechanical studies to evaluate the prevailing stress conditions. • Study the CBM capture cost into consideration with the mining operations that need to be accommodated in the optimization workflow where a reduction in in-situ gas content is of high priority. Based on the study, quantify the net emission reductions for the most optimum development strategy.	Rajeev Upadhyay (Indian Institute of Technology ISM Dhanbad)	42282000.00	Not Recommended Pertians to Ministry of Coal
246	SNTMO M/252/2020	A comparative study on the origin and evolution of carbonate and ultramafic hosted magnesites- Case study from southern India and Himalayas (Duration: 3 Yrs, 0 Mth)	1) Mineral chemistry, micro-textural and hyperspectral characterisation of magnesite deposits and their carbonate-ultramafic hosts 2) Characterisation of ore formation conditions through fluid inclusion micro-thermometric and compositional studies of magnesites and their host rocks 3) To probe major, trace and rare earth element signatures of the magnesites and their host rocks for constraining the petrogenetic settings and evolution in different mineralising environments 4) Stable (C & O) and radiogenic (Sr) isotopic studies on magnesite to understand its origin 5) Timing of different types of magnesite mineralization by using Sm-Nd isotopic systems	SAJEEV KRISHNAN (Indian Institute of Science Bengaluru)	10244860.50	Not Recommended Project is of Academic interest Application and end use missing

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
247	SNTMO M/253/2020	Development of India specific scientific framework to promote the beneficial reuse, rehabilitation or remediation of landscape affected by abandoned mines or flyash ponds or slags (Duration: 3 Yrs, 0 Mth)	1. To develop a framework to facilitate a successful transition to mine closure 2. To delineate potential uses of abandoned/inactive mines/fly ash ponds across India 3. To study the impact of rehabilitation on alleviating social, economic and environmental wellbeing of communities living in and around major mining centers in various parts of India.	Amit Verma (Indian Institute of Technology BHU Varanasi)	8319465.00	Recommended Project related beneficial reuse, rehabilitation or remediation of landscape affected by abandoned mines
248	SNTMO M/254/2020	Novel Material Manufacturing method for Large Volume Cast Metal Matrix Nanocomposites (Ultra-Cast) (Duration: 3 Yrs, 0 Mth)	1. Synthesis of feedstock MMNC that comprise a double step mixing technique-Distributive mixing + Dispersive mixing- to achieve (i) Nano composites with varying particle loading (aimed for 1-5wt%) (ii) Faster and efficient dispersion and distribution of nano particles by the combined effect of ultrasonication and impeller mixing (iii) Narrow size distribution of nano reinforcements in the composites (iv) The incorporation of all nano particles by wetting and subsequent suspension in liquid metal. 2. Casting of large volume MMNC by dilution of feedstock composite in large volume aluminium (Dilution-compo-casting technique). 3. Shaping of the MMNC into selective components via squeeze casting and centrifugal casting techniques. 4. Selection of metal and reinforcement, manufacturing of process facility, optimization of processing parameters, characterization of nanocomposites castings. 5. Dissemination of new understandings as technical papers, IPR and Technology Transfer	Sreekumar Vadakke Madam (Malaviya National Institute of Technology Jaipur)	7758200.00	Recommended Promising and upcoming material
249	SNTMO M/255/2020	Valorization of Mining and Industrial wastes in combination available in Belgaum for civil applications (Duration: 2 Yrs, 0 Mth)	The project is aimed at utilization of both foundry wastes (appx. 150 units in Belgaum generates 100 tons of waste foundry sand/month in sand reprocessing unit) along with RED MUD for effective utilization of both the wastes in combination towards a ceramic product for civil engineering applications. The presence of sodium oxide in RED MUD waste as an impurity is used for preparation of hard tiles, etc. The process utilizes sodium hydroxide (appx 3-5%) present in RED MUD as a glass forming agent in combination with silica (appx 85-90%) present in waste foundry sand as a glassy bond which imparts extra strength. Moreover, presence of sodium oxide in RED MUD favors GEOPOLYMER reactions which is gaining commercial importance as it do no emit CO2 and eliminates firing process for production of ceramics materials used in civil applications. The proposed project aims at utilization of such a hazardous by-product to a non-hazardous ceramic product for community utilization.	Visalakshi Talak okula (Bennett University)	4303700.00	Not Recommended Project does not meet the thrust area under MoM

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
250	SNTMO M/256/2020	Development of Multifunctional Reactor for Iron removal from Reduced Ilmenite in Oxygen Leaching Process (Duration: 3 Yrs, 0 Mth)	The aim of this proposal is to set up of a bench-scale multifunctional reactor for improving metallic iron removal rate from the reduced ilmenite in the leaching process. The key objectives: •Design and development of a bench-scale circulating fluidised bed reactor for oxygen leaching process with multifunctional operations including iron removal from the reduced ilmenite, oxygen mass transfer, separation of hydrated iron oxide and dilute acid followed by water washing; •Investigate the hydrodynamics and mass transfer characteristics of the proposed circulating fluidised bed reactor (gas-slurry-solid) leading to optimum design parameters; •Investigate oxygen leaching process along with multifunctional tasks in a circulating fluidised bed for improving the rate of iron removal; •Develop computational modelling for hydrodynamics, gas-liquid mass transfer and rusting reaction in a circulating fluidised bed reactor.	Panneerselvam Ranganathan (National Institute of Technology Calicut)	9633700.00	Not Recommended Project does not strictly meet the thrust area of MoM.
251	SNTMO M/257/2020	Development of p-Orienteer for Manufacturing Mining Tools Used in Hard Rock Cutting Industries (Duration: 3 Yrs, 0 Mth)	• Manufacturing of engineered diamond mining tools for granite rock excavation • Development of automatic novel p-orienteer rig for aligning μ -diamonds along strongest plane • Replacement of conventional sintering technology by chemical bonding system to improve tool wear resistance • Strategic selection of suitable grade of Diamond of definite shape, type and geometry • Assessment and comparison of tools performance in terms of plane interaction, failure mode, specific energy consumption and tool life w.r.t to commercially available tool	PRITHVIRAJ MUKHOPADH YAY (Indian Institute of Technology Delhi)	6645500.00	Not Recommended No novelty in the project.
252	SNTMO M/258/2020	Development of a Compact Portable Safe Green Cooling System for Underground Mine using Vortex Tube (Duration: 3 Yrs, 0 Mth)	This project aims to develop and deploy the vortex tube technology based low-cost compact portable safe green cooling system to efficiently cool underground mine development faces leading to comfortable and safe working condition for miners, energy savings, and improvement of productivity and profitability. The project proposes to undertake the following specific objectives: 1. Study of underground mine environment at different sites 2. Indigenous design and manufacturing of vortex tubes suitable for specific applications using 3D printing technology 3. Development of a laboratory test set-up to simulate vortex tube mine cooling 4. Development of a wearable vortex tube cooling vest for mine workers 5. Detail performance study of vortex tubes and the cooling vest in the laboratory 6. Field trial of vortex tubes and cooling vest at following locations: manual drive development face, raise development face, drill jumbo, and diesel load haul dumper	Tanmay Dutta (Indian Institute of Technology ISM Dhanbad)	6786000.00	Not Recommended Not thrust area of MoM.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
253	SNTMO M/259/2020	Integrated Sedimentologic, Mineral magnetic and Geochemical studies on the Heavy Mineral beach placers for REE exploration (Duration: 3 Yrs, 0 Mth)	Objectives: 1. Characterization and distribution of heavy minerals in the coastal stretches of Guhagarh to Mangalore using sedimentologic, rock magnetic and geochemical approaches. 2. Study of inter-association of heavy to light minerals, provenance and their relation to REE pattern. 3. Developing suitable methods for the concentration of REE bearing heavy minerals.	Dhananjay ChintamanMesh ram (Savitribai Phule Pune University)	5390500.00	Not Recommended R&D part is missing in the project.
254	SNTMO M/260/2020	Koilakuntla Limestone A new vista of cement grade limestone from the Cuddapah Basin, Andhra Pradesh (Duration: 3 Yrs, 0 Mth)	• To identify the suitability of the Koilakuntla Limestone for cement industry • To prove the depth persistence of the cement grade by drilling two or three deep holes • To help to boost the revenue of the Government of Andhra Pradesh • To prove the additional limestone reserves than hitherto known • To develop the Research and Development of the carbonate rocks in Andhra Pradesh	V. Sunitha (Yogi Vemana University)	5345200.00	Not Recommended Similar kind of work is being carried out by GSI
255	SNTMO M/261/2020	Potential Use of Mine Tailings in the Manufacture of Sustainable Construction Materials as Bricks and Pelletized Artificial Aggregates (Duration: 3 Yrs, 0 Mth)	The objectives for the proposed project are as follows: ? To characterize the mine tailings and study the material characteristics of the raw material. ? To investigate the feasibility of using geopolymer process for making bricks using mine tailings with alkaline activators. ? To manufacture artificial aggregate with appropriate binders using the process of pelletization.	S GEETHA (RAJALAKSHMI EDUCATIONAL TRUST)	3213800.00	Not Recommended Not in the thrust area of MOM.
256	SNTMO M/262/2020	Leaching of Rare earth elements from Secondary Sources using Kombucha tea (Duration: 3 Yrs, 0 Mth)	Kombucha tea is a heterogeneous culture of both yeast and acetic acid bacteria. It contains several microorganisms e.g. Zygosaccharomyces, Acetobacter which are already reported to recover REEs from secondary sources. It is also reported that Kombucha can be used to extract REEs from fluorescent phosphor. So, using this heterogeneous culture could provide an excellent way to extract REEs from sources like used batteries, magnets, phosphogypsum etc. The main goal of the project is to provide a simple, cost effective, environment-friendly method using Kombucha culture for the leaching of REEs from different secondary sources. The main objectives are: 1) Successful leaching of REEs from secondary sources like phosphogypsum, red mud, batteries, magnets etc using Kombucha tea. 2) Optimization of different physicochemical parameters to increase leaching efficiency. 3) Isolation and identification of new microorganisms capable of leaching.	Writachit Chakraborty (SWAMI VIVEKANANDA YOGA ANUSANDHANA SAMSTHANA)	5539360.00	Recommended Upcomng area of REE Novel concept

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
257	SNTMO M/263/2020	Operational Guidelines for Stable Overburden Dump Slopes based on Geotechnical Characterization of Mixed Soil-Rock Mining Wastes and Advanced Numerical Simulations (Duration: 2 Yrs, 0 Mth)	1. Geotechnical characterization of heterogeneous mining waste (mixed soil-rock) using field and laboratory investigations. 2. Numerical calibration of failure mechanisms observed in the field and laboratory using a discrete element framework. 3. Development of numerical models capable of replicating the construction sequence of dump slopes. 4. Investigate the various dumping process numerically and identify critical event leading to initiation, evolution and propagation of failure. 5. Assess various mitigation measures to protect mining operations in case of failure events. 6. Robust operational guidelines for stable dump slope configuration and protection measures	Nishant Roy (Birla Institute of Technology and Science Pilani)	3428700.00	Not Recommended Does not pertain to thrust area of MoM
258	SNTMO M/265/2020	Technology Development for the Extraction of Cobalt from Copper Smelter Slag (Duration: 3 Yrs, 0 Mth)	The main objective of this project is to develop efficient extraction technology for Co from various indigenous copper industry slag; both from converter and smelter slag. The final product will be high pure Co powder (Purity >99.8%) suitable for battery or permanent magnet applications. Recovery of other valuable metals such as Cu and Ni associated with the slag as well as utility of the process residue for construction applications will also be explored for viable techno-economic purpose.	Devabrata Mishra (CSIR National Metallurgical Laboratory)	9133200.00	Recommended Concept is good Focused proposal
259	SNTMO M/266/2020	CO2 sequestration through mineral carbonation of mining wastes and their application in manufacture of building materials through cementation technology (Duration: 3 Yrs, 0 Mth)	CO2 sequestration through mineral carbonation of mining/industrial solid wastes CO2 sequestration from industrial point source using mining/industrial solid wastes Utilization of CO2 captured mineral carbonated material in manufacture of bricks/blocks/tiles.	Surabhi DipaliMuduli (CSIR Institute of Minerals and Materials Technology)	4991544.00	Not Recommended Project is not mandate of MoM

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
260	SNTMO M/267/2020	Production of Cost-Effective Carbon Fiber from Coal Tar Pitch using Melt-Spinning - An Indigenous Approach to cater to High Performance Industrial Applications (Duration: 3 Yrs, 0 Mth)	The overall goal of this project is to convert coal tar pitch using a green approach into high-value carbon fiber for use in aircraft, automobiles, sporting goods, and other high-performance materials. To achieve this goal, following objectives have been identified: 1. To produce “green” (not yet carbonized) fibers from mesophase pitch using a melt spinning process and continuous thermal processing or oxidization. 2. To create woven preforms from the fibers for manufacturing composites and chopped carbon fiber for filled thermoplastics suitable for injection molding. 3. To demonstrate and characterize representative composite parts derived from the coal-to-carbon-fiber paradigm. This project will be able to show the maximized value of the coal resource stream; demonstrate a reduced investment risk for coal to carbon fiber manufacture and encourage substantial domestic carbon fiber manufacturing; and demonstrate end-uses for its derived composite materials.	Santosh Sridhar Mysore (Centre for Incubation Innovation Research and Consultancy)	11408652.00	Not Recommended This project does not meet the thrust area of MOM.
261	SNTMO M/268/2020	Assessment of stability of overburden dump slope of mines by application of stone column technology. (Duration: 3 Yrs, 0 Mth)	a) To develop a correlation of shear strength calculated through small DST with designed and fabricated proposed large DST apparatus. The size of large direct shear test apparatus should consider particle size up to 300mm of dump material. b) To assess the effect of variation moisture content on shear strength parameters of dump material (Instead of calculating shear strength parameters on optimum moisture content). c) To investigate the effect of void ratio (emin to emax) of dump material on shear strength parameters. d) To analyze the stability of overburden dump slope by LEM and Numerical Modelling methods at various moisture and void ratio conditions. e) To study the effect of the stone column stabilization technique on the stability of overburden dump slope by numerical and physical modeling. The stone column is yet not considered for the stability of overburden slope.	SUMIT SURESHRAO GEETE (SHRI RAMDEOBAB A SARVAJANIK SAMITI)	1995150.00	Not Recommended No novelty in the project.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
262	SNTMO M/269/2020	Fabrication of aluminium based collagen nanocomposites and investigation of its therapeutic application in Diabetic wound healing (Duration: 2 Yrs, 0 Mth)	1.To synthesize Al ₂ O ₃ /AgNPs/Collagen/Cellulose device (Ag NPs encapsulated collagen matrix will be embedded on cellulose paper) and their characterization. 2.To investigate antibacterial, antibiofilm and possible molecular mechanism of Al ₂ O ₃ /AgNPs/collagen/cellulose device against pathogenic antibiotic resistant and non-resistant S. aureus and P. aeruginosa. 3.To check the activity of oxidative stress associated factors and expression of important genes evaluation using different molecular approaches. 4. To investigate the biocompatibility of Al ₂ O ₃ /AgNPs/Collagen/Cellulose device under normal and hyperglycemia conditions towards mammalian cells followed by in vitro methods. 5.Application of Al ₂ O ₃ /AgNPs/Collagen/Cellulose device to evaluate the wound healing proficiency and elimination of infection caused by pathogenic bacteria in diabetic and non-diabetic mice (BL6 or BALB-c).	Amrita Mishra (kalinga institute of industrial technology)	3983700.00	Not Recommended Not in the thrust area of MOM.
263	SNTMO M/270/2020	ECO-FRIENDLY MANAGEMENT OF RED-MUD AND ITS UTILIZATION FOR REMEDIATING DEGRADED SOILS AND DEVELOPMENT OF COST EFFECTIVE MULTINUTRIENT RICH FERTILIZERS FOR SUSTAINABLE AGRICULTURE (Duration: 3 Yrs, 0 Mth)	1. To assess the effect of particle size, composition, and application rate of red-mud on growth, productivity, and micronutrient (Fe and Zn) bio-enrichment on soils possessing different physicochemical properties. 2. Development of red-mud based cost-effective eco-friendly multi-nutrient rich fertilizers for use in agriculture for nutritional and environmental sustainability. 3. Efficacy validation and environmental impact of the novel slow-release customized red-mud based modified fertilizers/ nutrient formulations/products in field crops and their effect on the availability of soil non-mobile and mobile nutrients and heavy metals and on micronutrient enrichment on soils having variable physico-chemical properties. 4. Develop technologies and guidelines for grain nutrient density and quality enhancement, the habitation of degraded land, and reducing their ecotoxicological impact from use of red-mud in agriculture.	BHUPINDER SINGH (ICAR Indian Agricultural Research Institute)	13524856.00	Not Recommended Pertains to ICAR

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
264	SNTMO M/271/2020	INVESTIGATION ON CORROSION BEHAVIOUR OF COLD SPRAY DEPOSITED METALLIC COATING ON WIND TURBINE BLADE (Duration: 3 Yrs, 0 Mth)	?Fabrication of CFRP composite using Hot Compression Method ? Mechanical characterisation in terms of tensile & flexural strength of CFRP ?Microstructural characterisation of CFRP in terms of Optical Microscopy,FESEM, FTIR (for detecting functional groups and characterising covalent bonding information) & DSC (to determine the degree of resin cured) ?Deposition of EN Ni coating on CFRP ?Milling of Cu,Al,Cr(x) powders to get powders of desired size range in planetary ball mill ?Deposition of Cu-Al-Cr(x) coating using optimised Cold Spraying Parameters ?Microstructural characterisation of coating using FESEM,EDS,XRD & hardness test by Nano indentation/Micro hardness ?Electrical conductivity measurement of as deposited coating ? Corrosion behaviour of coating & substrate using Potentiodynamic and EIS ?Salt spray test of coatings & substrate in aggressive environmental condition ?Characterisation of corroded coating using FESEM, EDS & XPS analysis	SHAIKH ABDULHAFIZ (Sardar Vallabhbhai National Institute of Technology Surat)	6039500.00	Not Recommended Project does not pertain to MoM and is not thrust area of MoM.
265	SNTMO M/272/2020	Mineral targeting of gold-bearing conglomerates along the eastern margin of the Pranhita-Godavari rift basin around Dongargaon, Chandrapur district, Maharashtra (Duration: 3 Yrs, 0 Mth)	a. Identifying all the conglomerate horizons from the stratigraphic section and characterize the clast types, sources as well as their mineral potential. b. Targeting the concealed source rock genetically related to the gold-bearing clasts in the conglomerate for future exploration and resource augmentation c. Characterization of the ore minerals, their mode of occurrence, and grade estimation	PitambarPati (Indian Institute of Technology Roorkee)	4438560.00	Not Recommended GSI is doing similar kind of work
266	SNTMO M/273/2020	Employing metallurgical silicon to develop new class of silicon composites for structural applications (Duration: 3 Yrs, 0 Mth)	a. To establish a process for utilizing metallurgical silicon for producing silicon composites b. To demonstrate the utility of silicon composites for structural applications by improving its strength and toughness compared to elemental silicon	Srikant Gollapudi (Indian Institute of Technology Bhubaneswar)	4620800.00	Recommended Upcoming concept and has future potential application

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
267	SNTMO M/274/2020	Design and development of energy efficient Lithium - Graphene battery for electric vehicles in underground mines (Duration: 3 Yrs, 0 Mth)	1. To create an energy efficient battery and to reduce the heat release to the surrounding environment from the batteries used during mining by absorbing the heat energy and using it back to charge the battery through a self-flexible nano TEG. 2. To perform the different tests like mechanical, electrical, environmental and chemical test to the so designed batteries under standard regulations	VENKATAKRI SHNAN (SSN TRUST)	4072800.00	Recommended Project related to development of energy efficient Lithium - Graphene battery for electric vehicles in underground mines
268	SNTMO M/275/2020	Development of cost-effective green technology for utilization of vanadiferrous magnetite ore for the production of ferrovanadium alloy (Duration: 3 Yrs, 0 Mth)	The objectives of present research proposal are (1) To maximize the recovery of vanadium as V2O5 in red cake from mother liquor (solution of vanadiferrous slag) by soda leaching/other leachant. (2) To optimize the leaching parameters such as ration of leachant to slag, pH of the solution, duration of leaching for high stripping of vanadium in red cake from slag (3) Recovery of ferrovanadium alloy with high percentage of vanadium from sodium vandate or ferrous vandate red cake economically (4) To decrease the power consumption of melting reactor during extraction of ferrovanadium alloy and (5) To reduce the production of harmful gases to make it sustainable and environmentally friendly.	UpenderPandel (Malaviya National Institute of Technology Jaipur)	4972550.00	Not Recommended Project is not under thrust area of MoM
269	SNTMO M/276/2020	Charnockites Rare Earth Element resource potential, A comparative case study from the Nilgiri massif and Madurai Block of Southern Granulite Terrain (SGT), South India (Duration: 3 Yrs, 0 Mth)	The main objective of the programme is to unravel the tectonic implications and to assess the Rare Earth Element (REE) potential of the Charnockites from the Southern Granulite Terrain. This can be achieved by aiming at the following. • To determine the elemental chemistry of the Charnockites. • To characterise the geochemical and variations in various Charnockite massifs. • To analyse the mineral chemistry of the Charnockite. • Estimate the economic potential of REE in the studied Charnockite.	PRATHEESH P (Central University of Kerala)	2686500.00	Not Recommended Elemental and preliminary objectives.
270	SNTMO M/277/2020	Assessment and Prediction of Temperature during Drilling of Sandstone and Limestone Rocks (Duration: 1 Yrs, 0 Mth)	1. Detailed investigation on temperature developed during rotary drilling of rocks using different thermocouple technique for different bit-rock combinations considered and also to study the influence of operational parameters on temperature. 2. Determination of Physico-mechanical properties such as uniaxial compressive strength, Brazilian tensile strength, density, abrasivity, hardness, Young's Modulus, Poisson's ratio and their influence on temperature. 3. To find the significant factors which influence on temperature during rotary drilling operation by using ANOVA. 4. Develop a prediction model for temperature using statistical analysis and Artificial Neural Network	VIJAY KUMAR S (Nitte Education Trust (R))	2035659.00	Not Recommended No novelty in the project.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
271	SNTMO M/278/2020	Molecular phytoremediation studies in mining areas of Cuddapah basin, India for mitigation of heavy metal pollution-An advanced green technology (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To investigate the contents of various heavy metals in soil samples of different mining areas of Cuddapah basin. Selection of heavy metal hyperaccumulator plant species grown in mining areas/soils (PGMA/S) and compared with the same plant species in non-mining areas/soils (PGNMA/S) using AAS or ICP-OES. Morphological, physiological and biochemical characterization of both PGMA/S and PGNMA/S samples to know the growth and development. Proteomic and metabolomic analyses using both PGMA/S and PGNMA/S samples to know the growth pattern and molecular factors to some extent. Molecular characterization of both PGMA/S (specifically hyperaccumulators) and PGNMA/S samples using DNA microarray and next generation sequencing (NGS)/transcriptome sequencing to find out the efficient molecular factors/receptors responsible for heavy metal uptake and their function in plant cells which in turn may be helpful to enhance the remediation capacity in other plants. 	Thummala Chandrasekhar (Yogi Vemana University)	4654500.00	Not Recommended Pertains to MoEFCC
272	SNTMO M/279/2020	Feasibility study on conversion of recycled rare earth magnetic materials into geometry magnetic alloy coatings by controlled plasma spraying (Duration: 3 Yrs, 0 Mth)	To develop a new gas shroud system with plasma spray torch for plasma coatings To investigate the effects of various spray parameters such as standoff distance, torch power, and No of passes. To optimize the plasma spay conditions in order to achieve the desired coating microstructure and obtaining better magnetic properties of the coatings. To investigate the plasma deposition mechanisms by performing diagnostic experiments To explore the feasibility recycling of rare-earth based scrap magnets through plasma coating.	GurusamyShan mugavelayutha m (Bharathiar University)	3178502.00	Not Recommended No novelty.
273	SNTMO M/280/2020	Development of value added refractory coatings and refractory bricks from Ferrochrome Slag (Duration: 2 Yrs, 0 Mth)	1. Recovery of metal values from as received FeCr slag and optimization of slag composition for high temperature application 2. Development of Refractory/thermal barrier coating from the processed FeCr Slag 3. Development of refractory bricks from the processed FeCr Slag	PRIYANKA RAJPUT (CSIR Institute of Minerals and Materials Technology)	3522000.00	Not Recommended No novelty.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
274	SNTMO M/281/2020	EXPERIMENTAL AND MODELLING INVESTIGATION OF SEDIMENT PLUMES PRODUCED DUE TO THE DEEP-SEA MINING ACTIVITIES (Duration: 3 Yrs, 0 Mth)	1. Experimental investigation of collector and discharge plumes formation, propagation and settlement 2. Modelling study of collector and discharge plumes and validation with the experimental results 3. Characterization of sediments and experimental investigation on dispersion settling of sediments under different environmental conditions 4. Investigation of possible mitigation strategies for reducing the environmental impact due to collector as well as discharge plumes 5. Acoustic mapping of sediment plumes generation propagation	Vishnu Chandrasekhara Nair (Rajiv Gandhi Institute of Petroleum Technology)	4550800.00	Not Recommended Project related to Deep sea mining.
275	SNTMO M/282/2020	Bioleaching of Lithium from minerals and low grade ores of Indian origin (Duration: 2 Yrs, 0 Mth)	Present project would like to attempt to develop a process for bioleaching of Lithium from minerals and low grade ores of Indian origin. Biomineral laboratory of CSIR-IMMT has large collection of such microorganisms while working with different minerals under different projects. A microbial process may be used to recover Li from a very low grade ore material where chemical process proves to be too costly and environmentally unsuitable. Objectives of the study are (i) Screening of microorganisms (bacteria and fungi) for their ability of bioleaching of Lithium from low grade ore found in India; (ii) Feasibility of bioleaching of Lithium using microorganisms after optimization of culture conditions with selected microorganisms.	Nilotpala Pradhan (CSIR Institute of Minerals and Materials Technology)	2377200.00	Recommended Concept is well defined. Possibility of future application
276	SNTMO M/283/2020	Development of Vibration Signature Based Grinding Process Monitoring and Control System in Tumbling Ball Mills of Mineral Processing Plants (Duration: 3 Yrs, 0 Mth)	The objectives of the proposed study are as follows: •Characterization of various grinding materials used in tumbling ball mills through matrix mapping (frequency signature). •Selection of sensors to acquire impact and vibration signal from ball mill. oDesign of sensor layout scheme on ball mill. oDesign of wireless data acquisition system to acquire vibration data from positions on mill shell. oDesign and development of algorithms for particle size detection by vibration signal analysis. •Development of innovative strategy for determination of required product fineness without overgrinding. •Development of a new process to bridge the gaps to improve the ball mill efficiency and introduce built-in flexibility for selective size output. •Development of algorithm. •Development of Field Programmable Gate Array (FPGA) based prototype system for the designed soft algorithms. •Design of prototype for validation of developed algorithms.	Hare Krishna Mohanta ()	4026900.00	Not Recommended Research is more of academic in nature and leads to fundamental understanding.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
277	SNTMO M/284/2020	Real-Time Energy Efficient Cyber-Physical Intelligent System for Mine Slope Health Monitoring (Duration: 3 Yrs, 0 Mth)	In open-pit mining, it is necessary to conduct a scientific study to plan, design bench, and dump slope to ensure adequate safety against the bench and dump failure hazards. One of the critical components of the bench and dump slope stability is monitoring macro and micro-movement precisely to predict such slope failure ahead of time so that appropriate mitigating measures may be taken to prevent catastrophic failure or reduce the consequence or impact of failure. The objective of the investigation is to ensure the safe health of mine slope. The primary objectives of this research were four-fold: Customise microelectromechanical system and deploy them in mine slope for monitoring slope deformation. Develop a secure and energy-efficient multifunction wireless sensor network system to monitor slope health in real-time. Monitor and analyses of mine slope deformation in real-time using a wireless sensor network. Predict mine slope deformation and develop an early warning system.	RadhakantaKoner (Indian Institute of Technology ISM Dhanbad)	12155400.00	Not Recommended Not thrust area of MOM.
278	SNTMO M/285/2020	Edge Intelligence for Real-time Mineral prospecting-exploration in locating mineral resources using drilling sound (Duration: 3 Yrs, 0 Mth)	Our main goal of this work is to predict the mineral prospecting and exploration using drilling sound and our goal is achieved by estimating the property of material using Artificial Intelligence based adversarial learning technique. In this project, we will perform experiments using Generative Adversarial Networks (GANs) over drill sound to predict rock properties like Uniaxial Compressive Strength (UCS), Schmidt rebound number (SRN) and Tensile Strength (TS) using sound level produced during drilling operation. The edge device would optimize the computation cost in order to perform working with the end devices.	RAJIV MISRA (Indian Institute of Technology Patna)	6020500.00	Not Recommended Project related to the prospecting operation.
279	SNTMO M/286/2020	Upgradation of Low Grade Chrome Ore Tailings to Increase Cr Fe ratio via Combined Pyro and Hydrometallurgical Route to Produce Low Carbon Ferrochrome (Duration: 2 Yrs, 0 Mth)	The objective of the present proposal is to utilize the low grade chrome ore/tailings which is difficult-to-enrich by conventional beneficiation process . To develop the low temperature reduction process (700 to 900oC) for upgradation of the Cr content from the low grade chrome ore (<35% Cr2O3) • To evaluate the maximum chrome recovery by magnetic separation and accelerated rusting method from the reduced chrome ore tailings . To develop an alternate beneficiation process to increase Cr/Fe ratio to greater than 2.5 from < 1 • An attempt to make low carbon Ferro chrome (Cr-60% min, C-0.1% Max) from the upgraded low grade chrome ore/tailings To address the above objectives, the preliminary studies were carried out as a proof of concept. Low grade chrome ore tailings (Cr2O3 ~28%) from Orissa with low grade coal (FC ~45%) was reduced at 850oC and 950oC for 3 hours in reduction furnace. Initial results show the increase of Cr/Fe from ~0.59 to ~1.8. (Details in Annexure: pg 5-8)	VENKATESAN J (CSIR National Institute for Interdisciplinary Scieene and Technology)	3534000.00	Recommended Potential for upgradation of low concentyration ores

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280	SNTMO M/287/2020	The Current Practises and Futuristic approach for Exploration and Exploitation of Copper Resources and Reserves in India (Duration: 1 Yrs, 0 Mth)	1. Understand the Current Practises followed in GF and BF Exploration and Exploitation of Copper 2. Suggest new methods and Technologies to increase the resources and reserves in GF and BF 3. Apply the suggested methods and technologies in Brownfields for Copper Exploration 4. Prepare a Road Map compiling Current Practises for future targets of Copper in Green and Brownfield Exploration fields	P V SUNDER RAJU (CSIR National Geophysical Research Institute)	6300000.00	Not Recommended R & D part missing.
281	SNTMO M/288/2020	Numerical Investigation on Forward and Reverse Performance Characteristics of a Single Stage Axial Flow Fan Designed for Mine Ventilation System Using CFD. (Duration: 3 Yrs, 0 Mth)	To design a suitable capacity single-stage axial flow fan for a mine ventilation system. One dimensional design will be developed followed by detailed three-dimensional numerical simulations. Geometric parameters effect on axial fan performance will be studied. The systematic design will be undertaken to visualize the 3-D flow behavior of the fan by using CFD to ensure the quality of fan configuration for mining ventilation. This CFD analysis of Fan performance will help to establish forward and reverse performance characteristics under controlled conditions and in typical mine installations. This leads to the development of mines fans and their operating characteristics at forward and reverse operation conditions. This project will also investigate the effect of fan reversal on airflow in order to predict the conditions during an emergency operation.	Dr Nithesh K G (SIDDAGANGA INSTITUTE OF TECHNOLOGY)	1955250.00	Not Recommended Not mandate and thrust area of MoM
282	SNTMO M/289/2020	Pilot plant investigation and CFD optimization of dewatering system of mines for transportation of highly concentrated Multiparticulate minerals (Duration: 3 Yrs, 0 Mth)	1. To investigate the physical, chemical and mineral characteristics like particle size distribution, settling, porosity, water holding capacity, density of mineral samples coal, iron ore, limestone, and copper etc. 2. To investigate the rheological characteristics of mineral suspension with and without additives at varying temperature environment. 3. To investigate the flow characteristics of dewatering system like pump and pipeline for the flow of mineral multiparticulate coarse gained slurry at different solid concentration and velocity using pilot plant test loop. 4. CFD simulation of additional degradation of dewatering system for the flow of multiparticulate coarse gained mineral slurry. 5. Suggestion for improvement in hydraulic design of dewatering system to improve the performance of the pumping system and reduction of erosion wear characteristics.	SATISH KUMAR (National Institute of Technology Jamshedpur)	2052000.00	Not Recommended Project is generic in nature and not well-defined objectives.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
283	SNTMO M/290/2020	Production of high pure manganese metal organic frameworks (Mn-MOFs) and their derivatives from low grade manganese ores for supercapacitor applications (Duration: 3 Yrs, 0 Mth)	? Utilization of low/lean grade manganese ores for producing energy materials ? Selective reductive leaching of manganese ? Preparation of high pure manganese precursors for MOF synthesis ? Synthesis of manganese MOFs and its derivatives with tunable porosity ? Investigation of electrochemical performances of MOFs and their derivatives as an electrode material for supercapacitor	Bankim Chandra Tripathy (CSIR Institute of Minerals and Materials Technology)	11038700.00	Recommended Concept is well defined. Potential for future application
284	SNTMO M/291/2020	Hot wire GTAW with single and double electrode for cladding and additive manufacturing applications in mining industries (Duration: 3 Yrs, 0 Mth)	1. To investigate the Effect of single & dual cathode hot wire GTAW process parameters with single and double electrode (solid & core wire) on dilution for cladding application. 2. To explore the performance of single & dual cathode hot wire GTAW process with single and double electrode for additive manufacturing applications .	VISHVESH JAYANTKUMAR BADHEKA (Pandit Deendayal Petroleum University)	2052000.00	Not Recommended Not thrust area of MoM and no novelty
285	SNTMO M/292/2020	Development of technology for production of hot briquetted iron (HBI) (Duration: 3 Yrs, 0 Mth)	The objective of the research proposal is to “develop an indigenous and industrially viable technology for effective utilization of waste iron oxide fines / slimes for the production of hot briquetted iron (HBI) using gaseous reductant at a pilot scale of 1 Ton.	Deepak Chandra Sau (CSIR National Metallurgical Laboratory)	462.67	Not recommended Pertains to Ministry of Steel
286	SNTMO M/293/2020	Development of Alternative flux Material from Red Mud for Steel Dephosphorization (Duration: 3 Yrs, 0 Mth)	• To develop alternate flux material from Red Mud or Bauxite Residue, which can be an economical replacement for lime in the BOF steel making process • Assessment of dephosphorization capabilities of the developed flux material This project proposal shall develop an alternative flux from the Red Mud, which can be used as an alternative for calcined lime in the steel making process. Usage of 10kg red mud-based alternative flux in place of lime in steel making applications can consume 1.12 MT of red mud annually. The successful development of the product shall aid in consuming the red mud inventories rapidly. Thereby it can decrease the environmental hazards faced by the Bauxite mining industries. In addition to that, it can create direct and indirect employment.	ANAND BABU G (CSIR Central Electrochemical Research Institute)	3779920.00	Recommended Potential use of red mud for future applications

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287	SNTMO M/294/2020	Evaluation of Algae for Potential Treatment of Acid Mine Drainage at Malanjkhanda Copper Deposit (Duration: 3 Yrs, 0 Mth)	The aim of this proposed study is to evaluate the role of indigenous algae, naturally found in the AMD impacted sites at Malanjkhanda copper mine, for the treatment of AMD. Thus, this proposed project has the following objectives: 1. Identification of algae present in the mine discharges along with the detailed study of corresponding water quality including pH, electrical conductivity, concentration of major ions (Ca, Mg, Na, K, SO ₄ ²⁻ and HCO ₃ ⁻), nutrients (PO ₄ ³⁻ and NO ₃ ⁻) and concentration of heavy metals such as Al, Cd, Cu, Fe, Mn Ni, Pb and Zn for understating the relationship between algal biomass and water chemistry through different season. 2. Quantification of bioaccumulation of metals in indigenous algal biomass through determination of total metal content 3. Establishing optimum removal condition for heavy metals using dominant algae at different condition of pH and time through series of experiments. 4. Treatment of the AMD by using indigenous dominant algae.	SK. MD. EQUEENUDDIN (National Institute of Technology Rourkela)	2313000.00	Not Recommended Project specific to one particular mine
288	SNTMO M/295/2020	Development of prototype aluminium seat frame for passenger buses. (Duration: 2 Yrs, 0 Mth)	1) To design and develop lightweight aluminium seat frame for passenger bus application. 2) To simulate the die design, die fabrication and extrude the profiles. 3) To develop and validate the prototype of aluminium seat frame for passenger vehicles as per AIS 023 standard.	V N S U VISWANATH AMMU (Jawaharlal Nehru Aluminium Research Development and Design Centre)	14302000.00	Recommended Development of product for aluminium downstream
289	SNTMO M/296/2020	Genesis of Paddar Sapphire Deposit, J and K (India) (Duration: 3 Yrs, 0 Mth)	The Paddar sapphire deposit is globally known for its high-quality gem sapphire. It is hosted by the feldspar rich pegmatite which intrudes the dark coloured ultrabasic rock. Though known for more than a century, the genesis of the sapphire deposit is still debatable for the absence of detailed scientific data. To fill this gap in scientific knowledge, the present research project aims at achieving the following objectives. • To understand the physicochemical evolution of the mineralizing fluid/melt responsible for the formation of sapphire at Paddar. • To comprehend the petrogenesis of pegmatite and ultrabasic rocks associated with the sapphire mineralization. • To propose a genetic model for the Paddar Sapphire deposit. • To suggest future exploration strategies.	Pankaj Kumar Srivastava (University of Jammu)	9996858.00	Recommended Potential for application in future

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
290	SNTMO M/297/2020	EFFECT OF ADDITIVES ON REDUCTION PROPERTIES OF IRON ORE COAL AND MILLSCALE COAL COMPOSITE PALLETS (Duration: 3 Yrs, 0 Mth)	? To study the effect of variation of basicity on physical and metallurgical properties of iron ore-coal pellets and millscale-coal pellets. ? To study the effect of millscale content on physical and metallurgical properties of iron ore-coal pellets. ? To study the effect of various process variables like size, shape, single or multi-layer bed and bed packing materials etc. on the reduction behavior pellets (having additives). ? To characterize the reduced pellets by estimating the degree of reduction, degree of metallization, compressive strength, swelling/shrinkage, porosity, bulk density, qualitative and quantitative phase analysis etc. through XRD and microstructure analysis by SEM.	Jyotirmaya Kar (Malaviya National Institute of Technology Jaipur)	4070868.00	Not Recommended Project is academic research in nature. No novelty in research.
291	SNTMO M/298/2020	Experimental evaluation of gas adsorption desorption characteristics and consequent stress-strain changes in Indian coal (Duration: 3 Yrs, 0 Mth)	The main objectives of the proposed project proposal are listed below: • Determination of proximate, ultimate, and petrographic parameters of coal obtained from the Raniganj coalfield West Bengal India. • The study of microstructure, surface morphology, and physical properties like porosity, pore size distribution, surface area etc. • Determination of Adsorption/desorption capacity of coal at variable temperature and pressure. • Development of isotherms and Adsorption/desorption hysteresis. • Effect of the swelling and shrinkage on the stress-strain regime of the coal. • Determination of permeability of coal • Development of mutual correlations and statistical analysis.	Harinandan Kumar (University of Petroleum and Energy Studies)	3289300.00	Not Recommended Pertain to Ministry of Coal
292	SNTMO M/299/2020	Development of a Laboratory scale Universal Direct Chill casting set up for Aluminium alloys Billets and Slabs (Duration: 2 Yrs, 0 Mth)	• To design and develop Laboratory scale universal Direct Chill (DC) casting set up for Aluminium alloys (Billets and Slabs) - round Billet: 150mm dia x 500 mm long - rectangular slab: 30mm X 100mm x 500mm • To produce prototype billets of AA2014, AA6063 and slabs of AA3003, AA5083 alloys	RAM NARAYAN CHOUHAN (Jawaharlal Nehru Aluminium Research Development and Design Centre)	16713400.00	Recommended National requirement to develop casting equipment

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293	SNTMO M/300/2020	Development of Room Temperature Ultra-Sensitive Array for Detection of Coal Mines Toxic Gases using Graphene Nanoribbons-MOx Nanocomposites (Duration: 3 Yrs, 0 Mth)	1. To synthesize high quality Graphene Nanoribbons (GNRs) and Metal Oxides (MOx)nanoparticles; ZnO, SnO2, Cu2O, NiO, separately in powder form, afterwards GNRs – MOx thin film will be prepared using spin coating method. 2. To perform the structural, thermal and electrical characterization, and analysis of as prepared nanocomposite. 3. Optimization of GNRs – MOx nanocomposites sensing materials for selective toxic gases, for CH4, CO, CO2, NO2, at Room Temperature. 4. Design and development of Room temperature ultra-sensitive electronic Sensing Array device (a prototype) for specific gases detection at 500 ppb to 1 ppm range with optimum accuracy and characteristics such as ultra-high sensitivity ~>20%, fast response and optimum recovery (approx. 100%). 5. Electronic circuit will be designed and integrated with the sensor array. It will give light signal and buzzer alarm both, including signal on the registered mobile through wireless mode.	Avshish Kumar (Amity University Uttar Pradesh Noida Campus)	4226028.00	Not Recommended Project doesnot meet the thrust area in mom and pertain to Ministry of Coal
294	SNTMO M/301/2020	Development of Flexible Dual Fuel High Efficiency Combustion Engine for Heavy Earth-Moving Machineries to Mitigate Fossil Fuel Usage and Environmental Footprint (Duration: 3 Yrs, 0 Mth)	Objectives To modify the existing diesel engine used in the Heavy Earth-Moving Machineries (HEMM) used in mining industry to work under flexible dual fuel low temperature combustion mode To develop alternate fueled (LNG/Diesel, LNG/Biodiesel, Methanol/Diesel, Methanol/Biodiesel) mining engine system integrated with advanced combustion strategies for emissions compliance and efficiency improvement To implement, develop and demonstrate a low temperature combustion scheme called dual fuel premixed compression ignition (DFPCI) To develop dual fuel electronic control management for the control of dual fuel admission and engine operation To reduce oxides of nitrogen (NOx) and particulate matter (PM) without after treatment To reduce the use of fossil fuel and carbon footprint on the environment (Kindly refere Associated Document File for Full Detailed Proposal. Due to characters limitation not able to provide all the information in these tabs)	Ganesh Duraisamy (Anna University)	8941000.00	Not Recommended Project in not thrusr area of MOM.

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295	SNTMO M/302/2020	Structural control on Iron ore and Gold mineralisation in Eastern part of Mahakoshal Belt, Madhya Pradesh (Duration: 3 Yrs, 0 Mth)	1) Mapping and investigating the micro to outcrop scale structures for movement of fluids. Characterisation of the micro to macro scale brittle to ductile features will reveal the paleo stress pattern and its control on the movement of fluids, which govern the enrichment process. 2) Identification of changes in Fe minerals using magnetic analysis and quantify the fluid flow dynamics. The mineralogical and spatial distribution of the magnetic minerals will reveal the direction and velocity of fluid flow. It will also expose the effects of fluid transport on Fe minerals, which is critical to put the knowledge of structural control and fluid flow into the perspective of local zones of enrichment. 3) Establishing the structural control. Establishing the structural control is important to determine the subsurface distribution of the enrichment zones. This will also assist in future prospecting and will decrease the number of exploratory wells.	Sandeep Bhatt (Indian Institute of Technology Roorkee)	7020800.00	Recommended Project has focused objectives and has potential for future application
296	SNTMO M/304/2020	Characterization and Bio remediation of mine water of a coalfield in Damodar Valley, India an energy conservation practices (Duration: 3 Yrs, 0 Mth)	I. To assess the seasonal mine water chemistry with special reference to sulphate and trace metals to understand the mineralogical constituents of coal and other affect the quality of water II. Mapping of most contaminated zones using a geographical information system (GIS) technique III. Bioremediation of mine water using facultative methylotrophic sulfate-reducing bacteria. IV. Development and analysis of metabolic interaction with metal and sulphate reduction. V. Demonstration in 10 l and detailed feasibility study along with techno-economic analysis for subsequent field implementation of this strategy.	MeetaLavania (The Energy and Resources Institute)	7985044.00	Not Recommended Pertian to Ministry of Coal
297	SNTMO M/305/2020	Study of cut and fill, post pillar method of mining for the possibility of reducing the mining loss by optimising the ore pillars (Duration: 3 Yrs, 0 Mth)	The objective of the S&T Project is to minimise the mining losses and to optimise the overall recovery of the ore reserve which otherwise is lost permanently in the mined out stopes. Through this project it is also proposed to develop suitable guidelines for establishing the dimensions, spacing, support requirement etc. in post pillar cut and fill mining under varying geo-mining conditions.	Rabindra Kumar Sinha (Indian Institute of Technology ISM Dhanbad)	46014530.00	Recommended Project has potential for enhancing recovery of mineral from U/G mines.
298	SNTMO M/306/2020	Reduction Kinetics of Iron Ore-coal Composite Pellet (Duration: 3 Yrs, 0 Mth)	The proposal is based on the hypothesis that the carbon utilization should increase with the increase in temperature and heating rate. Better slag-metal separation can also be achieved by adjusting the composition of the metal and slag. The core objective of this work is to look into: (i) The effect of heating cycle like temperature and heating rate on carbon utilisation and nugget formation. (ii) The effect of raw material composition on slag metal separation. (iii) Feasibility of low grade iron ore utilisation towards iron nugget formation.	Srinibash Mishra (National Institute of Technology Srinagar)	3877752.00	Not Recommended Project is academic research in nature. No novelty in research.

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299	SNTMO M/307/2020	Pilot plant investigation and CFD optimization of dewatering system of mines for transportation of highly concentrated multi-particulate minerals (Duration: 3 Yrs, 0 Mth)	1. To investigate the physical, chemical and mineral characteristics like particle size distribution, settling, porosity, water holding capacity, density of mineral samples coal, iron ore, limestone, and copper etc. 2. To investigate the rheological characteristics of mineral suspension with and without additives at varying temperature environment. 3. To investigate the flow characteristics of dewatering system like pump and pipeline for the flow of mineral multiparticulate coarse grained slurry at different solid concentration and velocity using pilot plant test loop. 4. CFD simulation of additional degradation of dewatering system for the flow of multiparticulate coarse grained mineral slurry. Suggestion for improvement in hydraulic design of dewatering system to improve the performance of the pumping system and reduction of erosion wear characteristics. 5.Suggestion for improvement in hydraulic design of dewatering system to improve the performance of the pumping system	SATISH KUMAR (National Institute of Technology Jamshedpur)	2052000.00	Not Recommended This project is duplicate submission of Project SNTMOM/289/2020 .
300	SNTMO M/308/2020	Evaluation and Development of Digital Image Correlation (DIC) based characteristic curves to predict rock failure (Duration: 3 Yrs, 0 Mth)	The objectives are: • Characterization of geomaterials: Physico-mechanical and geological • Evaluate the applicability of existing non-contact DIC approaches over contact based approaches • Develop a pre-failure indicator as warning system which can predict precursor failure as well as prevent its failure • Develop characteristics curves for varying conditions and predict physical phenomenon	MANOJ KUMAR MISHRA (National Institute of Technology Rourkela)	4637670.00	Not Recommended No novelty in the project.
301	SNTMO M/309/2020	Development of Low density Novel Al-Cr-Ni based High Entropy Alloy as Corrosion-resistant coatings for heavy-duty mining applications (Duration: 3 Yrs, 0 Mth)	The main goal of the proposed project proposal is to develop a novel high entropy alloy (HEA) as a corrosion-resistant material which can be employable as a stable coating material in mining related applications. The objectives are classified as below: 1. To develop a novel Al-Cr-Ni high entropy alloy (HEA) of different elemental compositions by PVD evaporation technique. 2. To evaluate the mechanical strength, stability and corrosion-resistance ability of the developed HEA coatings. 3. To test, validate and demonstrate applicability of the developed HEA in mining applications by developing a suitable prototype.	Aarti S. Bhatt (Nitte Education Trust (R))	5717976.00	Recommended Potential for increasing life of mining equipments
302	SNTMO M/310/2020	Recovery of valuable metals from waste red mud (bauxite residue) through the Nugget and electrodeposition processes (Duration: 3 Yrs, 0 Mth)	• To characterize the red mud for all minerals and elements. • To identify the minerals and elements to recover. • To explore and suggest the methods for the recovery of valuable metals such as iron, aluminum, titanium, and silicon from the red mud. • To explore and refine the nugget and electrodeposition processes for efficient recovery. • To study the techno-economic feasibility of the proposed recovery process. • To propose a plan of action for the valorization of red mud on the commercial scale.	Aditya Kumar (Indian Institute of Technology ISM Dhanbad)	4511950.00	Not Recommended No novelty.

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303	SNTMO M/311/2020	Development of Novel Adsorbent Coated Energy Exchanger for Post Combustion CO2 Capture from Metal and Mining Industries (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To design a novel adsorbent coated energy exchanger (ACEE) for post-combustion CO2 capture from metal and mining industries. Novel ACEE will be designed using helical threading configuration on to the tube surface for enhancing the CO2 capture and thermal conductivity of the adsorbent material. Zeolite 13X based adsorbent material will be synthesized on the novel helical threaded fin tube energy exchanger using fliriting epoxy as a binder. Development of a Buckingham pi-theorem based unsteady-state model for assessing the energy interactions in between the CO2 and Zeolite 13X based ACEE. A techno-economic feasibility of the helical threaded ACEE system will be assessed and compared with the traditional rotary based adsorption system for CO2 capture. 	Bukke Kiran Naik (National Institute of Technology Rourkela)	3418500.00	Not Recommended Project is not thrust area of MOM.
304	SNTMO M/312/2020	Development and Field Trail of a versatile pixel categorization and selection approach to improve Spaceborne Interferometric SAR (InSAR) applications in Metal Mining Environment (Duration: 3 Yrs, 0 Mth)	<p>a) Development of a versatile Pixel categorization and selection approach to include all possible phase-stable pixels/scatterers in surface and underground metal mining environments to improve the spatial density of measurement points for better land surface deformation studies.</p> <p>b) Field Trial and comparison of the developed approach for its performance assessment in the selected sites (surface and underground metal mining areas of Bellar-Hospet and Khetri Copper Belt) using suitably selected InSAR data set (s)</p>	Mohammad SoyebAlam (Indian Institute of Technology ISM Dhanbad)	2919000.00	Not Recommended Project is not thrust area of MOM.
305	SNTMO M/313/2020	Experimental and numerical investigations of airborne respirable dust concentration, propagation and dispersion in highly mechanised underground metalliferous mines (Duration: 3 Yrs, 0 Mth)	The objectives of the proposed study are outlined as follows: 1. To study the generation of airborne respirable dust in different mining operations in highly mechanised underground metalliferous mines and identify the major dust generating sources in the mines. 2. To study the propagation and dispersion behaviour of airborne dust at major dust generating locations in mechanised underground metalliferous mines through CFD modelling and VentSim software. 3. To estimate the air quantity required to dilute the dust concentration to a safer level at major dust generating locations in underground metalliferous mines. 4. To propose suitable measures for dust control in highly mechanised underground metalliferous mines.	Devi Prasad Mishra (Indian Institute of Technology ISM Dhanbad)	3524700.00	Not Recommended Not thrust area of MoM

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306	SNTMO M/314/2020	Development of enhanced tribological surface for efficient hydraulic slurry transportation and energy conservation in mining applications (Duration: 3 Yrs, 0 Mth)	1) To identify the root causes of various failure modes in centrifugal slurry pumps and slurry pipelines used for hydraulic transport systems in mining industries. 2) To develop the nickel-based hardfacing on existing grades of stainless steel (AISI-304, AISI-316L) and mild steel substrate materials presently used in hydraulic transport systems. 3) To analyze the slurry erosive and abrasive wear characteristics of developed tribological surface and its comparison with existing grades of base materials. 4) To examine the microstructural alterations of nickel-based hardfaced surface and its correlation with the wear behavior of the developed surface. 5) To compare the cost-effectiveness of the newly developed tribological surface with the existing materials in terms of enhanced service life and reduced maintenance cost. 6) To minimize the energy consumption arising due to the friction and wear of mechanical equipment used in mining industries.	Vivek DevidasKalyankar (Sardar Vallabhbhai National Institute of Technology Surat)	3810140.00	Recommended Project related to hydraulic transportation in mining which saves energy.
307	SNTMO M/315/2020	Development of Novel High Entropy Alloys having Balance Magnetic and Mechanical Properties (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To synthesize a Novel low-density HEAs • To optimize the synthesized HEAs in regard to the Magnetic Properties. • To optimize the developed magnetic HEA for enhanced mechanical properties. • To optimize the synthesized HEAs having balance mechanical and magnetic properties. • To optimize loped materials in regard to their resistivity for the commercial use of Developed soft magnetic HEAs • To optimize the developed HEAs for the Industrial Applications. 	Rohit Ranjan Shahi (Central University of South Bihar)	6141850.00	Not Recommended Not focused No clarity
308	SNTMO M/316/2020	Waste dump reclamation and utilization for recovery of possible beneficial minerals in Lead-Zinc mines of Rajasthan- A Sustainable Framework for Resource and Environmental Management at the Mines (Duration: 3 Yrs, 0 Mth)	1. Complex characterization of mining wastes from few Lead-Zinc deposits and beneficiation plants in Rajasthan area. 2. Optimization of the recovery methods and technologies, and assessment of technical-economic feasibility of the proposed separation/recovery processes of important minerals like Lead (Pb), Zinc(Zn), Silver (Ag) and Germanium (Ge) from these wastes. 3. Proving the feasibility of conserving natural resources based on the evaluations carried out, including mapping of site location, for a sustainable waste management. 4. Assessment of soil degradation in the nearby lands due to erosion and leaching of mine waste dumps and beneficiation mill wastes. 5. Fate and transport of contaminants in the surrounding soil and water regime. 6. Suggest reclamation and fast soil improvement technique by phytoremediation of the waste dump of Lead-Zinc mines.	Biswajit Paul (Indian Institute of Technology ISM Dhanbad)	7274500.00	Not Recommended Potential only for one particular industry

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309	SNTMO M/317/2020	DEVELOPMENT OF GEOPOLYMER MORTAR USING RED MUD AND GRANITE WASTE POWDER COMBINED WITH PHASE CHANGE MATERIAL FOR CONSTRUCTION APPLICATIONS (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To develop a new geopolymer binder from the combined use of red mud and granite waste powder. • To optimize the mix design of red mud-granite waste (RMGW) geopolymer binder and mortar. • To evaluate the performance of red mud-granite waste geopolymer binder and mortar with respect to its microstructure and mechanical properties. • To develop paving blocks from the RMGW geopolymer binder • To develop masonry blocks from RMGW geopolymer mortar. • To study the thermal behaviour of RMGW geopolymer mortar incorporated with micro encapsulated and macro encapsulated phase change material. 	Yashida Nadir (College of Engineering Trivandrum)	2449550.00	Not Recommended Project does not meet the thrust area in MoM. Repetition (Similar project allotted to JNARDDC by S&T)
310	SNTMO M/318/2020	IoT based remote monitoring and early warning system for detection of unstable slopes and slope failures in the open-cast mines. (Duration: 3 Yrs, 0 Mth)	In respect to world's mineral production, opencast mining is a very cost-effective mining method allowing a high grade of mechanization and large production volumes. In India, fast increase in output of various minerals can be largely attributed to rapid increase in opencast mining activities and intensified mechanization. As a direct consequence, the amount of waste mining and dumping will also be commensurately very high thereby increasing the risks of highwall slope failures tremendously. Under such situations, with most production areas concentrated close to the excavation floor, there is a constant danger to the men and machinery deployed thereat with a potential to cause catastrophic loss of life and property. Thus, diligent monitoring of slopes for early warning signs are imperative to protect life and equipment. Objective of this project necessitates the development of latest IoT based effective slope monitoring systems for routine inspection of the rock and their deformation.	quazimohmmad alfred (Aliah University)	4200460.00	Recommended High potential for early warning of slope failure in mines.
311	SNTMO M/319/2020	Dry vis-a-vis wet beneficiation study of wollastonite mine waste dumps. (Duration: 2 Yrs, 0 Mth)	Development of dry and wet beneficiation process to beneficiate wollastonite from waste dumps of Wollastonite mine, Rajasthan.	Santosh Deb Barma (CSIR Institute of Minerals and Materials Technology)	4041250.00	Not Recommended Repetition of work already done by IBM Ore dressing lab

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
312	SNTMO M/320/2020	Investigations on Laser assisted mining combined in-situ spectroscopy analysis for elemental identification (Duration: 3 Yrs, 0 Mth)	Application for Laser technology for drilling rocks samples reduces mining cost because of its higher transmission capabilities providing an alternative to conventional drilling and blast techniques. In addition, mineral exploration industry requires new method and tools to address the challenges of the mineral resources. Laser Induced spectroscopy can be considered as an emerging geotechnical tool for mineral exploration that can provide rapid in-situ compositional analysis and high-resolution imaging in both laboratories and field. The Peculiar aspect of the Laser Induced spectroscopy has a capability to detect element with low atomic number. A Technology of combining Laser assisted mining combined spectroscopy based elemental analysis will be highly interesting in the field of mining	Palani I A (Indian Institute of Technology Indore)	8002000.00	Recommended Project related to use of laser technology in drilling. New concept
313	SNTMO M/321/2020	Harnessing REE Mineralization britholite, allanite and associated REE-minerals of the Phenai Mata Igneous Complex, Gujarat A laboratory scale process development for REE enrichment (Duration: 3 Yrs, 0 Mth)	The proposed project is focused at evaluating the mineralization potential of the layered gabbros and associated rocks of the Phenai Mata Igneous Complex, ChhotaUdepur District of Gujarat, with the aim of developing a protocol for low-cost extraction of the REE-carrier minerals phases namely britholite, allanite and synchysite; spelt explicitly under the following objectives: (ii) To evaluate the mineralization potential of the layered gabbros and allied rocks of the PMIC for commercial exploitation of the REE-minerals, and (iii) To establish a protocol for low-coast extraction of REE-rich mineral phases, namely, britholite, allanite and synchysite occurring in the PMIC.	Abhijeet A. Bhondwe (Government College of Engineering Karad)	3806250.00	Recommended The problem is well defined. Methodology of work well laid out and doable. The deliverables are well defined.
314	SNTMO M/322/2020	Heavy Mineral Concentration in the beach sands of coastal Karnataka (with special reference to the Rutile, Sphene, Ilmenite and Zircon), their economic potential and sustainable mining (Duration: 3 Yrs, 0 Mth)	1. Detailed mineralogical, geochemical and textural studies on the heavy minerals, and delineate pockets of/ zones of concentration 2. Understand their mode of concentration/ replenishment and conservative estimation of the resource for sustainable mining 3. Evolve a suitable strategy (flow chart) for their separation based on their mineral assemblage, size grade, density and magnetic property.	Shalini G (NATIONAL EDUCATION FOUNDATION)	2540720.00	Not Recommended Not mandate of Ministry of Mines.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
315	SNTMO M/323/2020	Prospect-scale Target Generation for Concealed Orogenic Style Gold Mineralization in the Largely Soil Covered Dharwar-Shimoga Basin in Dharwad Haveri Districts, Dharwar Craton (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Evolve scientific concepts for target generation for gold exploration in the dominantly (80%) soil-concealed parts of the D-S Basin, particularly within the EDSB Auriferous Tract. • Come up with Multi-parametric Field Criteria for discovering gold anomalies and prospects within the EDSB. • Elucidate the structural control of gold mineralization in EDSB. • Understand the timing of mineralization to decipher the conditions favorable for gold deposition as well as use geochronological data as one of the tools for target generation. • Prioritisation of the known BIF-hosted gold Prospects and gold-anomalous locations for progressing them to gold Resource definition stage under UNFC G1 stage of Exploration. • Genetic Modelling of Gold mineralization in BIF and associated rock types. • To evolve SOP (Standard Operating Procedures) involving QA/QC for future exploration programmes in the D-S basin. 	Venkatraman S Hegde (DHARMASTHALA MANJUNATH ESWWARA EDUCATIONA L SOCIETY (REGD))	27090160.00	Recommended The problem is well defined. There are many deliverables. Systematic approach would be necessary to get a fruitful outcome.
316	SNTMO M/324/2020	PRODUCTION OF BIOCHAR FROM A BLEND CONSISTING OF PROSOPIS JULIFLORA BIOMASS WITH POLYETHYLENE USED AS FUEL AND TO AMEND SOIL CHARACTERISTICS (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> i) To obtain biochar employing co- torrefaction method using a blend consist of the wood chips of Prosopis juliflora and carry bags waste (polyethylene) ii) To optimize the % of carbon present in the char to a maximum, varying percentage of carry bags will be mixed in proportions. iii) All varieties of biochar will be characterized through proximate & ultimate analysis, IR, TGA, SEM, BET, UV-Vis., XPS, etc. iv) Characterization of the obtained char as fuel will be assessed using Gross Calorific Value (GCV), Fuel ratio (FR), Combustibility Index (CI), Ignition temperature, etc. v) A char with higher quality will be used as fuel for thermal power stations, cement industry. vi) Amendment of mined soil by mixing biochar obtained from this process in varying percentages. vii) Growing plants in control soil and the biochar mixed waste soils. viii) Evaluating the fertility of the soil by measuring characteristics like dissolved carbon content, nutrients, etc. 	D. Madhavan (MSECSVKS)	1954670.00	Not Recommended Not thrust area of MoM
317	SNTMO M/326/2020	An Integrated Green electrochemical approach towards beneficiation- exfoliation of industrial graphitic waste and recovery of byproducts and evaluation of rGO as electrocatalyst for ORR (Duration: 2 Yrs, 0 Mth)	<ul style="list-style-type: none"> Develop an electrochemical or an integrated chemical and electrochemical process to purify graphite concentrate (98-99%) and to recover value-added metal through selective anodic dissolution at 100 L scale. Analyze and quantify “Green hydrogen” generated at the cathode. Develop electrochemical reactors to purify graphite and produce reduced graphene oxide at a scale of 2 Kg per day. To evaluate the developed rGO as “metal-free” electrodes for oxygen reduction reaction (ORR) in aqueous electrolyte. 	C NAVEEN KUMAR (CSIR Central Electrochemical Research Institute)	13649300.00	Recommended Potential for future application

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318	SNTMO M/327/2020	Lithium and Rare-Earth Element Potential of Pegmatite and Albitite in parts of Jharkhand and Rajasthan to cradle future needs of energy and high-tech materials- An Atmanirbhar Bharat Initiative (Duration: 3 Yrs, 0 Mth)	1. Identifying all the pegmatite bodies speared over in parts of Jharkhand and Rajasthan and classify them based on the mineral chemical and geochemical analysis. 2. Assessment of total Li content, Li-bearing mineral phases in the pegmatite as well as REE minerals, and associated rare mineral phases through petrography, EPMA, LA-ICP-MS. 3. Assessment of REE content in albitite and correlation for possible separation with existing methodology available. 4. Setting future prospecting concepts and target areas for expanding exploration of Li and REE.	ALIK SUNDAR MAJUMDAR (Indian Institute of Technology ISM Dhanbad)	6252752.00	Not Recommended Similar projects taken up by GSI.
319	SNTMO M/328/2020	Designing and Fabrication of gas sensors and Detection of hazardous gases in underground mines through a secured Internet of Things (IoT) platform (Duration: 3 Yrs, 0 Mth)	1. A nano gas sensor array can be designed to detect the hazardous gases methane, carbon monoxide, hydrogen sulfide, hydrogen inside the mines. 2. Simulation study in COMSOL with gaseous environment to explore the device response before fabrication. 3. Highly selective, ultra-sensitive, low cost, high reliability, and fast response gas detection may be achieved by using metal oxide nanowires. 4. Gas sensors can be procured and plotted on various locations of the underground mines to measure the hazardous gas levels in the mines at different locations. 5. The sensor data is to be sent to the Cloud through IoT gateway. 6. The server at remote location will collect all the data from the cloud. If the level of hazardous gas level is high then It should be capable of alerting the administrative authorities of mines. 7. A secured IoT network to be established to detect botnet or any other malicious attacks. 8. A mobile application to monitor the hazardous gas level at different locations	Jay Chandra Dhar (National Institute of Technology Nagaland)	5324002.00	Not Recommended Project is not thrust area of MoM
320	SNTMO M/329/2020	Development of apposite mine layout using Drop raise with Barrier pillars for safe and economical exploitation of narrow vein Metalliferous deposits (Duration: 3 Yrs, 0 Mth)	1.To mine out valuable minerals economically with marginal dilution and high percentage of ore recovery from narrow vein Metalliferous deposits . 2. Development of mining method with less involvement of manpower, thus ensuring better safety. 3.To design composite mine layout to minimize the cost of establishments, mine development cost and operational cost. 4. Reduction of environmental impact of Mining.	FALGUNI SARKAR (National Institute of Technology Rourkela)	4249200.00	Recommended Project envisagerecovery of mineral from narrow vein.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
321	SNTMO M/330/2020	Sustainable ion exchange resin-based technology for rare earth extraction (Duration: 2 Yrs, 0 Mth)	Objectives 1. Development of sustainable ion exchange resins-based technology to extract REEs. 2. Follow the same methodology for one field sample of relevance to India. Selective extraction of REEs from ores using ion exchange resins involves strong interaction of the metal with specific resins, leading to the uptake of the metal. In this process, we will use biopolymer-based materials like chitosan, lignin, etc., and functionalise them with specific groups/resins to extract REEs efficiently. In this context, chitosan and lignin can be functionalised with aminopolycarboxylic acids [e.g. EDDHA (ethylenediamine-N,N'-bis(2-hydroxyphenylacetic acid)), EDDS (ethylenediamine-N,N'-disuccinic acid), EGTA (ethylene glycol-bis(β-aminoethyl ether)-N,N,N',N'-tetraacetic acid), EDTA (ethylenediaminetetraacetic acid), DTPA (diethylenetriaminepentaacetic acid)]. The resultant product could be used to extract elements like Nd from electronic waste of Nd containing materials.	Thalappil Pradeep (Indian Institute of Technology Madras)	52.51	Recommended Upcoming technology and has huge potential in future applications
322	SNTMO M/331/2020	Bio-electrochemical reclamation of titanium and other rare earth metals from red mud waste using a modified microbial fuel cell approach (Duration: 3 Yrs, 0 Mth)	The aim of the project is to develop an integrated microbial and electrochemical process to leach and extract specific REE like titanium and scandium from bauxite residues. The detailed objectives are as follows. 1. To develop an extremophilic and acidophilic bacterial consortium that can leach REE like titanium, scandium and other REE present in bauxite residue 2. To develop a polyaniline functionalized electrode surface having the capacity to electrosorb REE specifically more of titanium and scandium from the liquid leach bath 3. To develop a bio-electrochemical reactor capable of supporting both leaching and electrosorption process. 4. To determine the efficiency of the developed bio-electrochemical reactor under varying operating conditions and to optimize the best extraction process.	R. Selvakumar (PSG and Sons Charities)	3744720.00	Recommended Potential for future application
323	SNTMO M/332/2020	Recovery and in-situ utilization of metals from solid and liquid waste of selected metals mines industry for development of energy storage systems. (Duration: 3 Yrs, 0 Mth)	(1) Extraction of heavy metals from the Liquid and solid wastes of Zinc and Copper mines and industry. (2) Development of cost-effective adsorbents/media for removal/separation of metal ions. (3) Modification of the adsorbents into suitable media for the energy storing device. (4) Fabrication of energy storage device from the as-synthesized materials. (5) Testing the efficiency of the fabricated device through different Assessment tool (Like LCA software).	Brijesh Kumar Mishra (Indian Institute of Technology ISM Dhanbad)	6308600.00	Not Recommended Not focused No novelty

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324	SNTMO M/333/2020	Eco-friendly Process for recovery of TiO ₂ from Industrial wastes and its use for making Titanium Alloy (Duration: 2 Yrs, 0 Mth)	The main objective of the present proposal is to utilize the Ti bearing waste and off grade Ti sponge for indigenous Ti alloy development. • To develop the eco-friendly process for the recovery of TiO ₂ in rutile form and Ferro Titanium (>50%Ti) from Red Mud and TiO ₂ sludge. • Another attempt will be made to develop cost effective Ti alloys by using off grade Ti sponge and FeTi from red mud and sludge. • Optimize the content of Al and Fe to obtain maximum improvement in high temperature and fatigue properties through vacuum refining and alloying addition. Preliminary studies on FeTi from Ti bearing minerals conducted by CSIR NIIST and the results shows the possibility of producing 30 to 50%Ti grade material. IIT Indore has made the Ti alloys from the scrap and results are attached as proof of concept in Annexure pg: 10-13.	JAYASANKAR K (CSIR National Institute for Interdisciplinary Sciece and Technology)	6509750.00	Not Recommended Not focused Clarity mising
325	SNTMO M/334/2020	Deep learning based Energy efficient and cost effective PV Based smart drone for land mining applications (Duration: 3 Yrs, 0 Mth)	1. To design and develop an Deep learning based smart drone for monitoring and to provide optimal conditions for open mining. 2. To develop LIDAR based terrain mapping and thermal imaging (deep learning based - DQN/RLN) to detect local minerals concentration in open ore. 3. To provide energy savings in comparison to conventional systems using Photovoltaic (PV) based autonomous charging dock. 4. To study the characteristics and efficiency by Pilot plant implementation and test in the existing mine	Mohana sundaram K (K P R CHARITIES)	2623280.00	Recommended Project has future applicatiions it envisages use of drone for land mining applications.
326	SNTMO M/336/2020	Application of Nano High Entropy Alloys to Reduce Energy Consumption and Abrasion of Equipment Used in Mining Industries (Duration: 3 Yrs, 0 Mth)	• A simple and practicable pseudo binary method to design high entropy alloys (HEAs) using the parameters of valence electron concentration (VEC) and mixing enthalpy (?H _{mix}) will be incorporated. • Synthesis of nano sized high entropy alloy powder through high energy ball milling and to understand the phase evolution ability of the new systems. • To save energy by applying a balanced set of price and non-price measures to continually reduce energy. • To reduce the problems relating to the abrasion of equipment in mining and associated industries. • To apply nano high entropy alloy abrasion-resistant coatings, to reducing repair or replacement costs associated with damaged parts. This process is inexpensive in the production of parts and is often economically justifiable • The nano size high-entropy powder will be formed into a flux-cored electrode and used as a coating on a sample using the Oxyfuel powder spray (OFP)/Thermal spray method.	ANIL KUMAR (BHILAI INSTITUTE OF TECHNOLOGY TRUST)	4593000.00	Not Recommended Theoretical in nature Not focused Very common process

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327	SNTMO M/337/2020	Biomining of rare earth elements from acid mine drainage by microbial route (Duration: 2 Yrs, 0 Mth)	<ul style="list-style-type: none"> • Selection of suitable microbial strains for bio mining. • Collection and characterization of acid mine drainages for rare earth elements extraction . • Optimization of process parameters for bio mining of rare earth elements. • Designing, fabrication of lab scale bioreactor for bio mining. • Evaluation of bio-mining efficiency of selected microbial strains. 	Vetrivel Anguselvi (CSIR Central Institute of Mining and Fuel Research)	7587200.00	Not Recommended No Novelty. Not recommended
328	SNTMO M/338/2020	Integrated Liquid-Liquid extraction with Phase Separation using Triple Helical Microreactor for Hydrometallurgy - Process Intensification Study through Simulations and Experiments (Duration: 3 Yrs, 0 Mth)	1. Experiments on triple helical microreactor (THM) system for Cu ion extraction with aqueous sol. of Cu(II) ions as feed and LIX84 diluted with kerosene as solvent: exclusive setups for flow and extraction efficiencies. 2. CFD modelling and simulations of flow and extraction process that includes devising strategies for i) detailed study of secondary flow patterns along with experimental validation using high speed imaging and particle image velocimetry and ii) comparison of mass transfer coefficient predicted with experimental results 3. Optimization to achieve higher extraction efficiency and formulating correlations for mass transfer coefficients for different operating and geometrical parameters.	Soubhik Kumar Bhaumik (Indian Institute of Technology ISM Dhanbad)	4760494.00	Recommended Promising technology for future
329	SNTMO M/339/2020	Design and Development of Process Automation for new cementitious materials using copper tailings and its valorization in eco-friendly industry ready products (Duration: 3 Yrs, 0 Mth)	The primary aim of the study is to reduce the adverse impact on the surrounding environment and suggest a sustainable utilization of copper tailings. The objectives of the study are divided into the following points: Perform the material characterization of waste and find the available minerals, their percentage along with the elemental composition. To evaluate the significance of cementing properties of the raw waste material. To explore the feasibility of treatment options to enhance the cementing property along with its durability. To assess the optimum cementing value of copper tailing which can be economical, viable & sustainable for different utilization in industry-ready products. To develop mechanisms for product development at a laboratory scale (Prepare specimen for use in concrete & other useful products). To collaborate with industries for scaling up the process of product development at the local level for the benefit of the small & marginalized rural population.	Ajit Pratap Singh (Birla Institute of Technology and Science Pilani)	8875200.00	Not Recommended This project does not strictly meet the thrust area of MOM Enough research has already been done by various researchers.

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330	SNTMO M/340/2020	Development of Polyurethane Foam Filled Flat Proof Tyres for Vehicles Used in Underground Mines Import Substitution towards Aatmanirbhar Bharat (Duration: 3 Yrs, 0 Mth)	Objectives: a) Development of polyurethane based soft, flexible and resilient foam material. b) Characterization and testing of PU foam its structural analysis and certain physical properties like Hardness, Resilience, Flex-fatigue resilience behaviour etc. c) Design & development of special metering pump for injecting developed PU foam in tyres. d) Scaling up of the developed technology to industrial scale. e) Transfer of technology to the interested agency	Bharat Pandurang Kappate (Indian Rubber Manufacturers Research Association)	5110528.00	Not Recommended Project is not under thrust area of MOM.
331	SNTMO M/341/2020	Large scale iron ore mine tailing recycling for converting into hybrid green composite materials for high performance multi-functional applications (Duration: 3 Yrs, 0 Mth)	? Synthesis and development of new class of hybrid composites materials as alternative of the wood plastic composites (WPC), glass reinforcement plastics (GRP) and plastics materials using mines and iron ore tailing ? Development of the advanced hybrid composites for high strength microwave shielding materials and their validation using full-wave simulation tools. ? Target specification and process optimization in achieving targeted materials to use as an alternative material for WPC, GRP and plastic materials for civil infrastructure, transport system Indian railway and ship building materials ? Pilot scale manufacturing of high-performance hybrid composite materials using iron ore tailing and hyperdilution of suitable organic and inorganic wastes particulates and validation of materials performance ? Technology dissemination and networking with industries and confidence building, entrepreneurs and startup to realize the commercial opportunity and to generate the employment	AsokanPappu (CSIR Advanced Materials and Processes Research Institute)	37808368.00	Not Recommended Pertains to Minsitry of Steel
332	SNTMO M/342/2020	Development of Sustainable Pervious Concrete Incorporating Graphite Ore Tailings (GOTs) and Shredded Plastic Carrier Bag Wastes (PW) for Pavement Applications (Duration: 3 Yrs, 0 Mth)	OBJECTIVE To determine the mechanical and durability properties of pervious concrete incorporating graphite ore tailings (GOTs) and plastic carrier bag wastes (PW) for achieving sustainable development SCOPE The scope of the proposed research study is limited to the following. • Graphite ore Tailings (GOTs) will be considered for replacing cement and supplementary cementitious materials • Plastic wastes (PW) generated from carrier bags only will be considered • Mechanical properties that will be evaluated are compressive strength, flexural strength and splitting tensile strength • Durability properties that will be considered are water absorption by immersion and capillary action	J. DANIEL RONALD JOSEPH (CSIR Central Electrochemical Research Institute)	2927476.00	Not Recommended This project does not strictly meet the thrust area of MoM

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333	SNTMO M/343/2020	Exploring the impact of bauxite as an effective oxygen-carrier for Chemical Looping Combustion A bench scale Study (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> Quantify the role of red mud as oxygen carrier in chemical looping combustion. Quantify the material properties of Indian redmud and promising features available in it for the efficient combustion process. Quantify the recyclable capacity of redmud as oxygen carrier, number of cycles its can be recycled between the two reactors in CLC process. Quantify the filler materials to be added along with Indian redmud to enhance the reduction capacity. Quantify the reduction capability of Indian redmud during multiple cycle experiment. Quantify the monetary benefits when employing Indian redmud, a recycling material as fuel in combustion process. 	Dhinesh Balasubramanian (MSECSVKS)	3622750.00	Not Recommended No clarity Not focused Confusing title and objectives
334	SNTMO M/344/2020	Delineation of Vindhyan Supergroup and Bundelkhand Gneissic Complex in Ganga Valley Basin with newly acquired images from reflection seismic Data (Duration: 3 Yrs, 0 Mth)	The objectives of the project are following: 1. Understanding of Bundelkhand Gneissic Complex (BGC) in the subsurface 2. Relation between Faizabad Ridge and BGC 3. Specialized seismic data processing in view of illuminating the basement rocks 4. Mapping of Gangetic alluvium from reflection seismic 5. Integrating gravity and magnetic data with reflection seismic for enhancing hard rocks 6. Identifying geophysical signatures for mineralized zones.	SATISH KUMAR SINHA (Rajiv Gandhi Institute of Petroleum Technology)	4296476.00	Not Recommended R&D part is missing Similar kind of work is with GSI
335	SNTMO M/345/2020	A Facile, Cost Effective and Environmental Friendly Route to Recovery of Metals from Mining Wastes Under Ambient Conditions (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> Synthesis of reducing group functionalized polymers and crosslinked networks Conversion of metal salts to zero valent metal forms under mild conditions using the above materials Extraction of these metals and separation from mining wastes under homogeneous and heterogeneous conditions Assessment of selectivity and efficiency in different waste formulations Exploring the feasibility in a pilot scale demonstration to support the industrial implementation 	Umaprasana Ojha (Rajiv Gandhi Institute of Petroleum Technology)	4045700.00	Not Recommended The project is of academic research in nature. No industry participation. No novelty in process.
336	SNTMO M/346/2020	Sustainable Utilization of Copper Tailings in Various Civil Infrastructural Facilities (Duration: 3 Yrs, 0 Mth)	1. Evaluate the physical and mechanical properties of Copper Tailings (unreinforced and waste tire chip reinforced) by various laboratory and field tests. 2. Numerical calibration of laboratory results and development of design guidelines for waste tire chip reinforced ground for various load-bearing applications. 3. Develop a rational design methodology and guidelines for use of Copper Tailings (with and without tire-chips) in subgrades, embankments, mine backfilling and foundations. 4. Comparative cost analysis and Life Cycle Assessment (LCA) with commonly available granular fills.	Ravi Kant Mittal (Birla Institute of Technology and Science Pilani)	3109950.00	Not Recommended This project does not strictly meet the thrust area of MOM.

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337	SNTMO M/347/2020	Dispersion pattern of trace and RE elements in Manganese Formations of different Geologic milieu, Odisha India (Duration: 3 Yrs, 0 Mth)	1. Collection of representative Manganese Ore sample from different stratigraphic unit (on the basis of mode of occurrence and grade) and associated Mn-containing rocks. 2. To establish the dispersion pattern of trace & RE elements and their relative abundance in the above two categories of Ore samples and Mn-containing rocks. 3. To establish preferential enrichment of trace/s & REE /s, if any, towards manganese, iron and / or clay mineral phases present in the above three categories of sample.	PATITAPABAN MISHRA (Ravenshaw University)	2493200.00	Recommended Interesting idea and similar kind of work is being pursued by GSI.
338	SNTMO M/348/2020	Prototyping of Low-Cost Portable Mineral Exploration System Magnetic Detection and Ranging (MaDAR) (Duration: 3 Yrs, 0 Mth)	The main objective of the proposed project is “Design and Development of Prototyping of Low-Cost Portable Mineral Exploration System: Magnetic Detection and Ranging (MaDAR)”. Following are the Sub-objectives of the proposed project: • Design of directed magnetic field source enabled with metamaterial. • Mineral Exploration using directed magnetic field. • Mineral Detection and localization based on permeability / changing in operating frequency/Magnetic Susceptibility. • Estimation of mineral extent using array based magnetic system.	Vinay Kumar (Motilal Nehru National Institute of Technology Allahabad)	7583650.00	Not Recommended No Novelty.
339	SNTMO M/349/2020	Design and Development of a Novel Energy Recuperative System for Hybrid Hydraulic Excavator and its Fault Diagnosis (Duration: 4 Yrs, 0 Mth)	• Design and development of effective energy recuperative hydraulic system consisting of one three-chamber cylinder representing the three linear actuators of a hybrid excavator • Fabrication of the lab-scale simplified hydraulic system of the hybrid excavator • Analysis of energy stored through the proposed system and its effect by analyzing the back pressure and cylinder lowering responses • Comparative analysis of energy consumption for a particular duty cycle of the system with and without energy recovery through simulation and experiments • Model-based fault diagnosis of the developed hydraulic system for successful implementation of the scheme • Fault-tolerant control of the developed system to operate in degraded mode with an objective to reduce the downtime in the production line before maintenance	Niranjan Kumar (Indian Institute of Technology ISM Dhanbad)	6428000.00	Not Recommended Project is not thrust area of MOM.
340	SNTMO M/350/2020	Fabrication and Characterization of Mine waste based Composite (Duration: 3 Yrs, 0 Mth)	Objectives i. Find out the industrial need. ii. To identify the mineral waste which can be used with other materials to make composites. iii. To make the composite by suitable fabrication process.	RAJESH KUMAR BHUSHAN (National Institute of Technology Manipur)	4769000.00	Not Recommended This project does not strictly meet the thrust area of MOM. No specific mine tailings identified

File No.Met4-14/3/2020-Metal IV

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341	SNTMO M/351/2020	Development of Roof Fall Warning System for Underground Excavation vis-a-vis IoT based AI Enabled Real-time Smart Roof Sag Remote Monitoring System (Duration: 3 Yrs, 0 Mth)	Prime objectives of this S&T project proposal are: 1. To monitor the ground behavior (GB) in real-time using appropriate Micro-Electro-Mechanical Systems (MEMS) Technology based electronic instrumentation, smart technology and Information and Communication Technology (ICT) based innovative approaches. 2. To design and develop MEMS technology based AI Enabled Real-time Smart Roof Sag Remote Monitoring System for the underground metal mines (UGMM) for online monitoring to form the basis of an effective early warning system. Next, field study and performance monitoring of the RT-GBMS	Abhaya Kumar Samal (Dinabandhu Foundation for Educational Research and Socio economic Development)	5633282.88	Recommended Project related to early warning of roof fall in U/G mines.
342	SNTMO M/352/2020	Study of dry processing of low grade Indian iron ore fines for sinter feed application (Duration: 2 Yrs, 0 Mth)	Objectives: • Dry beneficiation of unusable dumped fines into a value added product by improving the iron content and reducing the SiO ₂ and Al ₂ O ₃ content for sinter feed application. • Development of process flowsheet involving dry processing of iron	SHOBHANA (CSIR National Metallurgical Laboratory)	6692700.00	Not Recommended Pertain to Ministry of Steel Enough research has already been done in dry processing of iron ores worldwide. And found to be encouraging on lab scale only.
343	SNTMO M/353/2020	An ergonomics study to evaluate the impact of physical work environment on cognitive behavior of the workers working in mines (Duration: 3 Yrs, 0 Mth)	• To measure and categorize the physical work environment of various Indian mines. • To evaluate the impact of physical work environment (dust, noise, heat stress) on cognitive behavior of workers working in mines. • To propose key ergonomics interventions.	Urmi Ravindra Salve (Indian Institute of Technology Guwahati)	5027176.00	Not Recommended Project is not thrust area of MoM as it relates to improving the working conditions at work place in mine,

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344	SNTMO M/354/2020	Thermodynamics based design of Aluminum and Magnesium alloys containing REs through CALPHAD and ICME Approach (Duration: 3 Yrs, 0 Mth)	Prediction of phase diagram of Al-Si-Mg alloys & Mg-Zn alloys based on CALPHAD approach for getting optimized composition of Al-Si-Mg and Mg-Zn alloy Prediction of phase diagram by systematic addition of Sc, Ce, to optimized Al-Si-Mg alloy and systematic addition of Gd to optimized Mg-Zn using CALPHAD approach. Microstructure simulation using MICRESS software for Sc, Ce-added Al-Si-Mg alloys and Gd added Mg-Zn alloys to understand the influence of the alloying elements and optimizing the alloy composition Gravity casting of optimized composition of Sc, Ce added Al-Si-Mg alloy and Gd added Mg-Zn alloy and validation with simulated results for the microstructures. Detailed characterization of cast alloys through SEM,TEM, EDAX, optical microscope tec. Experimental evaluation of mechanical properties & tribological properties of the optimized alloys Generation of thermophysical properties of these alloys	S. Savithri (CSIR National Institute for Interdisciplinary Sciece and Technology)	12136500.00	Recommended Potential for developing new alloys and products
345	SNTMO M/355/2020	Exploring the Practicability of Extracting Platinum and Palladium from the Mineral Beds of Sittampudi Village in Salem District of Tamil Nadu An Experimental and Molecular Dynamics Approach (Duration: 3 Yrs, 0 Mth)	Exploring the practicability of extracting Platinum and Palladium from the mineral beds of Sittampudi village in Salem district of Tamil Nadu. Detailed mineralogical studies on the above-mentioned chromite bands to improve the extraction efficiency. Extraction of Pt and Pd from the aforementioned ore using the solvent extraction method and weak-base anion exchanger. Selection of suitable anion exchanger resin and organic solvent using molecular dynamics simulations. Process optimization, economic assessment, and recommendations for scaling-up the process.	Karthik V (National Institute of Technology Trichy)	6762754.00	Recommended Potential for developing high value material
346	SNTMO M/356/2020	Durability Study on ECO-BLOCK using Marble Sludge Powder and Flyash (Duration: 2 Yrs, 0 Mth)	i. ECO-BLOCKS are made of waste products without releasing any harmful toxins into the environment. This green building material absorbs less heat and water, thereby making it more preferable over clay bricks. The composition of ECO-BLOCKS is uniform and strong. Since they are lightweight, they reduce the dead load on buildings. The method of manufacturing these blocks is energy efficient. All in all, ECO-BLOCKS promote sustainability and reduce the overall cost and wastage of building materials. ii. Utilization of fly ash and MSP will offer in cost reduction in cost of sand and approximately we save 40% of cost of clay brick production on construction by using MSP in Replacement of Sand. Energy savings and arguably superior products with minimal hazards to the environment. iii. To investigate the durability of MSP and Fly ash in cement mortar experimentally by using Rapid Chloride Penetration test, Water Absorption test.	M.SHAHUL HAMEED (P S Ramasamy Telugu Minority Educational & Charitable Trust)	4992500.00	Not Recommended Project is not thrust area of MoM as relates to building material.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
347	SNTMO M/357/2020	Numerical and experimental study of flow and heat transfer through reactive porous coal stockpiles (Duration: 3 Yrs, 0 Mth)	In this study we intend to carry out a detailed CFD analysis as well as experiments on the flow through and around porous coal stockpiles considering different geometries (shape and size) of the coal stockpile (triangular, quadrilateral, etc) as well as different stacking arrangement (multiple stockpiles in tandem). Analyze numerically the effect on wind velocity, porosity and permeability of coal stockpile on the flow and heat transfer characteristics considering the stockpile as a porous medium of uniform porosity and permeability. Considering the outer boundary of the stockpile to have a different porosity & permeability compared to the inner layer of the stockpile and perform CFD simulations. Perform simulations considering forced, mixed and natural convection heat transfer from the coal stockpiles. Calculate numerically the maximum temperature inside the coal stockpile. Perform wind tunnel test.	Shanmugam Dhinakaran (Indian Institute of Technology Indore)	4471000.00	Not Recommended Pertain to Ministry of Coal
348	SNTMO M/358/2020	Evaluation of failure and fracture toughness of rock for underground rock cavern application (Duration: 3 Yrs, 0 Mth)	The primary objectives of the project are to: • Conduct mechanical characterization of Khondalite Rock • Conduct experimental investigation of failure in Khondalite rock • Conduct experimental investigation to compute fracture toughness for fracture mode I, II and III • Develop noble approach to compute mixed mode fracture toughness (involving all three modes) • Develop analytical development for the failure and fracture behavior of rock • Develop a numerical model to predict the failure and fracture toughness prediction in the rock and validation with experiment and analytical approach	Deepak Kumar (National Institute of Technology Jamshedpur)	3576080.00	Not Recommended No novelty in the project.
349	SNTMO M/361/2020	Integrated Multiplexed IoT Enabled Microfluidic lab on Chip Device for detection mining chemical pollutants (Duration: 3 Yrs, 0 Mth)	To develop an in-built potentiostat based microfluidic chip device for handy and point care detection of mining pollutants Designing multiplexed, microfluidic electrochemical sensing platforms for detection of various mining chemicals like hydrazine, Xanthates, Magnafloc, Flotigam, Ferrosilicon and Methyl Isobutyl Carbinol. Synthesis of structurally engineered nanomaterials: metallic, non-metallic, polymeric, ceramic, carbon based etc. compatible for selective multiplexed interference mitigated detection. Field analysis of the fabricated device with the integrated microfluidic chip for mining chemicals detection at deep sea waters, lands and water bodies near mining sites and mineral processing plants . Development of internet of things (IoT) enabled integrated microfluidic electrochemical sensor with miniaturized sub systems.	Satish Kumar Dubey (Birla Institute of Technology and Science Pilani)	4399400.00	Not Recommended Project is not thrust area of MOM.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
350	SNTMO M/362/2020	DEVELOPMENT OF A PROTOYPE FOR THE IDENTIFICATION OF THE METAL ORE MINERAL LOCATION USING COSMIC MUONS (Duration: 3 Yrs, 0 Mth)	1. The objective is it to build a prototype for the identification of the location where the metallic ore/minerals has been deposited. 2. To understand and use the modern cutting edge technology for the development of the prototype. 3. The prototype will be work on the basis of muon interaction and scattering. It is non hazards and safe. 4. Develop the imaging method using muon which are free and continuously falling on the earth surface . 5. Exploration of the prototype for multiple use in mining sector (eg: determinations of the quantity in a small piece of the ore moving on a conveyer belt in factory) with suitable modification.	Prasanta Kumar Rath (Centurion University of Technology and Management)	4902810.00	Not Recommended Project is not thrust area of MOM.
351	SNTMO M/363/2020	Development of Artificial Coarse Aggregate for Concrete Production using Coal Refuse (Duration: 3 Yrs, 0 Mth)	OBJECTIVE Development and demonstration of artificial coarse aggregate for the production of concrete using coal refuse. SCOPE The scope of the proposed research study is assessing the fresh, mechanical, durability properties of concrete with developed artificial coarse aggregate. Physical properties of Developed Coarse Aggregate: • Specific Gravity • Water Absorption • Fineness Modulus Fresh Concrete Properties: • Workability • Fresh Density Hardened Concrete Properties: • Dry Density • Compressive Strength • Split Tensile Strength • Flexural Strength • Bond Strength • Modulus of Elasticity Durability Properties: • Water absorption • Resistance to Chloride ion Penetration Test (RCPT) Corrosion Behaviour of Steel Rebar: Corrosion behavior of steel rebar embedded in concrete with developed coarse aggregate evaluated by Electrochemical Studies such as Electrochemical Impedance Spectroscopy (EIS), Linear Polarization Resistance (LPR) and Potentiodynamic Polarization.	Ashok M (CSIR Central Electrochemical Research Institute)	3278976.00	Not Recommended Project does not meet the thrust area of MOM and pertain to Ministry of Coal
352	SNTMO M/364/2020	Durability study on ECO-BLOCK using Marble SludgePowder and Fly ash (Duration: 2 Yrs, 0 Mth)	1.Utilization of fly ash and MSP will offer in cost reduction in cost of sand and approximately we save 40% of cost clay brick production on construction by using MSP in Replacement of Sand. Energy savings and arguably superior products with minimal hazards to the environment 2.ECO-BLOCKS are made of waste products without releasing any harmful toxins into the environment. This green building material absorbs less heat and water, thereby making it more preferable over clay bricks. The composition of ECO-BLOCKS is uniform and strong. Since they are lightweight, they reduce the dead load on buildings. The method of manufacturing these blocks is energy efficient. All in all, ECO-BLOCKS promote sustainability and reduce the overall cost and wastage of building materials.	M.SHAHUL HAMEED (P S Ramasamy Telugu Minority Educational & Charitable Trust)	2496250.00	Not Recommended Project is not thrust area of MoM as it relates to the building material.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
353	SNTMO M/365/2020	Economical and Environmentally Extraction of Rare Earth Elements from Lignite Coal and Its Byproduct (Duration: 3 Yrs, 0 Mth)	The main objectives of the proposed research are: 1. To assess in details of all Rare Earth Elements (La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Em, Yb, Lu) and Sc, Y in Lignite coal, overburden and lignite combustion products. 2. To develop suitable leaching tests methods and conduct series of aqueous leaching experiments for understanding and estimation of the extraction behaviour of the rare earth elements (REEs). 3. To develop physical separation techniques to enrich of rare earth elements from lignite coal and lignite combustion products. 4. To estimate extractable reserves of Rare Earth Elements (REEs) resources in three acting mining areas when total REEs concentrations greater than 500 mg/kg.	Debabrata Das (Panjab University)	8991952.00	Recommended High potential project as there is demand for REEs
354	SNTMO M/366/2020	Bioleaching of Rare Earth Elements from bauxite mines of Kachchh, Gujarat A prospective cost effective technology for exploration of REE for industrial applications (Duration: 3 Yrs, 0 Mth)	• Reconnaissance survey in the mines of Kachchh and to identify potential mines for exploration of rare earth elements from bauxite mines of Kachchh and complete mapping of the area to highlight the current scenario of REE in Kachchh . • Characterizing the possible minerals and quantification of REE's in the bauxite residues and the mineralogical characterization of the samples using XRD and SEM. • To isolate the total heterotrophic microorganisms from the mine soils and mine tailings and its application in the removal of gangue minerals. • To further study the microbial community structure via metagenome of mine soil and mine tailings. • To study the effect of bioprocess variables in bioleaching experiments and to study the bioaccumulation and interactions of the REE and the cultures. • To evaluate REE for their photocatalytic activities for further applications. • To understand the economic evaluation of the optimized technology in bioleaching of REE	K KARTHIKEYA N (GUJARAT INSTITUTE OF DESERT ECOLOGY)	13333656.00	Recommended High potential project as there is demand for REEs
355	SNTMO M/367/2020	Multi-Level Sound synchronize intelligent hearing aid for miners in Mines (Duration: 3 Yrs, 0 Mth)	To design an intelligent and safe hearing aid to protect the miners from NIHL (Noise-induced hearing loss). – To protect the miners from Psychological Issues health issues like aggressive behavior, disturbance of sleep, constant stress, fatigue, depression, anxiety, hysteria, and hypertension. – To protect the miners from Physical Problems like headaches, high blood pressure, respiratory agitation, racing pulse, gastritis, colitis, and even heart attacks with continuous Noise pollution/exposure. – To protect the miners from Cognitive Issues & Behavioral Changes caused by the noise. – To improve the miner's ability to focus, performance levels over time. – To improve the brain response rate and memory of miners, and make them active – To reduce the Sleeping Disorders caused by continuous high noise levels and to make them emotionally balanced. – Thereby, to increase productivity in mining.	BHAVANARA YANA. KOTTE (GANTA SRIRAM EDUCATIONAL SOCIETY)	2950418.07	Not Recommended Project does not pertain to MoM thrusr areas and mandate

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
356	SNTMO M/368/2020	Spectral Chemical and Chronological Studies of Red Sand Deposits in southern and eastern India Provenance and implications for Heavy Mineral Exploration (Duration: 3 Yrs, 0 Mth)	(i) Detailed field studies in and around the red sand deposits for understanding the mode of occurrence of red sand beds, connecting river/stream channels, and link with country rocks; (ii) Characterize the various minerals present in the red sand deposits using major, trace and REE chemistry, hyperspectral radiometer, Laser Raman spectrometer, XRD, FTIR, SEM and EPMA (iii) U-Pb geochronology of detrital zircon/monazite grains from selected red sand beds and connecting river sand deposits to understand depositional ages, (iv) Quantitatively estimate the economic grade (quality) of the heavy mineral deposits associated with the red sand beds using spectral and chemical techniques, (v) Understand the source by comparing the geochemical characteristics and the radiometric ages of sand deposits and various lithologies in the hinterland of study areas, (vi) Chart out the paleoclimatic conditions of deposition and its relationship to past tectonic/climatic processes in the study areas.	Rajesh V J (Indian Institute of Space Science and Technology)	8805064.00	Not Recommended Not under mandate of Ministry of Mines.
357	SNTMO M/369/2020	Development of Mineral Specific Spectral Database and Application of Raman Spectroscopy in Minerology (Duration: 2 Yrs, 0 Mth)	1. Raman spectroscopy will be used as a tool for the identification and the characterization of minerals, and in the observation of phase transition in minerals. Details of spatial distribution of components, mineral phases and chemical variations which may contribute significantly to understand sample's complexity can be studied via Raman scattering. We target to apply Raman scattering in petrography, mineral exploration, and quality control in mining. 2. In close collaboration with GEOVALE, the proposal intends to build a Raman database for a specific mining company and help building mineral mapping at a given location. 3. Field study will be undertaken with handheld Raman spectrometer to correlate the Raman database built in the laboratory.	Subhadeep Datta (Indian Association for the Cultivation of Science)	8940000.00	Recommended The problem is well defined and the methodology of work well laid out and doable.The deliverables are well defined.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
358	SNTMO M/370/2020	A Novel Approach for Buffer Zone Analysis of Mines using QIM- DCT Based Fusion Technique (Duration: 3 Yrs, 0 Mth)	Providing a filter or barrier against human access and undesirable use of the core zone or conservation area; Protecting the core zone or conservation area from invasion by exotic plant and animal species; Providing extra protection against storm damage, drought, erosion and other forms of damage; Extending the habitat and thus increasing the population of large, wide-ranging species in the protected areas; Enhancing environmental services provided by the reserve, e.g. watershed protection; Providing a flexible mechanism for resolving conflicts between the interests of conservation and those of the inhabitants of adjacent lands; Improving the earning potential and quality of the environment of local people; Building local and regional support for conservation programmes; Safeguarding traditional land rights and cultures of local people; Providing a reserve of animal and plant species for human use and for restoring species, populations and ecological processes	S. RAJESH (MSECSVKS)	1421835.00	Not Recommended It does not address a critical gap in country's needs and requirements.
359	SNTMO M/372/2020	HYBRID FILLER REINFORCED SUPER HYDROPHOBIC EPOXY POLYBENZOXAZINE COATINGS FOR CORROSION RESISTANCE COATING IN MINING INDUSTRY (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> • To design and fabricate GO- TiO₂ hybrid epoxy and epoxy/polybezoxazine nanocomposites with different compositions • To study the phase separation and cure behavior the nanocomposite material • To study the mechanical, rheological, and viscoelastic properties of the nanocomposite material • To study the thermal and electrical conductivity of the nanocomposite material • To design and develop high performances epoxy composites as a corrosion resitant coating in mining industry 	Sabu Thomas (Mahatma Gandhi University Kottayam Kerala)	4148400.00	Not Recommended This project does not meet the thrust area of MOM. As it relates to developing a corrosion resistance epoxy coating compound.
360	SNTMO M/374/2020	Intelligent system designing for optimizing fuel utilization through minimizing indirect losses on enhancing efficiency of power plant (Duration: 3 Yrs, 0 Mth)	This proposed work focus on power thermal power plant efficiencies, which associated with many more indirect losses and has been broadly examine for purposeful solution for it . Waste heat can be primary point here, which be suitable to reuse at certain heating process, is a concept of efficiency improvement. Some of most sensitive point like draying of fuel, preheating air for combustion monitoring, and rising of feed water temperature is observed for better approach during this work plan. It is theoretically proved, minimization of an extra 3% wt. on moisture of fuel and rise up to inlet air of 350c. Improving efficiency by 1% and saving of 50 ton of fuel on and average during a year. This research leading to modeling of acceptable structure of digital controller with intelligent operational behaviors. Adaptation for self-tuned behavior improved over the controller to rapid changes of the error deviation is major support of this. Again, the error rate change by delay effects,	Sambhu prasad (GAYATRI EDUCATIONA L SOCIE)	2833200.00	Not Recommended This project does not meet the thrust area of MOM as it relates to improving the efficiency in thermal power plant.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
361	SNTMO M/375/2020	Development of Lithium Ion cells from indigenously developed graphite anode and technology validation for automotive application. (Duration: 1 Yrs, 3 Mth)	1. To evaluate the graphite material developed from by product of coals mined as a potential anode material and tests its functional performance and safety. The cell will be evaluated against standard graphite anode material. 2. To carry out structural (physical, chemical) and electrochemical characterization of developed electrode materials and produce pouch cells based on its energy output to adapt to end mobility applications.	Ujjwala Karle (Automotive Research Association of India)	5303550.00	Not Recommended Not thrust area of MoM. Pertain to ministry of coal and also to Ministry of electronics & ministry of heavy industries
362	SNTMO M/376/2020	Valorization of activated marble mining waste along with industrial and agricultural wastes for cement concrete pavements. (Duration: 3 Yrs, 0 Mth)	o Characterization of waste materials namely Fly ash, silica fume, rice husk ash, GGBS, marble dust and sugarcane bagasse ash for both physical and chemical properties. o Activation of marble dust by using various techniques such as heating and crushing, alkali activation, and activated magnesium oxide, etc. o Demonstrate the feasibility of using solid waste marble slurry, fly ash, silica fume, rice husk ash, and ground granulated blast furnace slag as a resource construction material in cement concrete pavements. o Study the performance of Pavement quality concrete In terms of mechanical and durability properties. o Investigating the environmental and economic aspect of using these waste materials in concrete pavements by performing Environmental impact analysis. o Availability and Accessibility of Waste marble dust in conjunction with other locally available waste for its Utilization in construction industry: A GIS-Based Network Analysis	A B Danie ROy (THAPAR UNIVERSITY)	3906350.00	Not Recommended The project does not strictly meet the thrust area of MOM as it realtes to making alternate use of marble processing waste for cement concrete pavements
363	SNTMO M/377/2020	Development of Novel and Green Process for Recovery of Metals from Copper Ores and E-waste (Duration: 3 Yrs, 0 Mth)	The main objective of the proposal is to develop a novel and green process for the recovery of metals from copper ores and electronic waste, and setup of 50 kg/day pilot plant for metal recovery. Specific objectives of the project are as follows: 1. Collection and characterization of copper ore and e-waste. 2. Pre-treatment of ores and e-waste for concentrating metal fraction 3. Exploring the application of DES and low temperature roasting for metal recovery, and optimization of process parameters 4. Selection of greener and economically efficient process 5. Design and setup of 50 kg/day capacity pilot plant for processing e-waste and ore to recover metals	KAMAL KISHORE PANT (Indian Institute of Technology Delhi)	15433020.00	Recommended Potential for recovering valuables metals from copper tailings

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
364	SNTMO M/378/2020	Assessment of Dust Emission and Estimation of Emission Factors for Mining Projects in India (Duration: 3 Yrs, 0 Mth)	Emission from mining project are fugitive in nature and not vented through stacks. Hence, it is difficult to assess dust emissions from mining projects leading to uncertainties in emission estimations. Few studies carried out in India for estimation of emission from mining projects and these studies are limited in nature and application, due to of random in nature (one-time study), theoretical estimation devoid of actual measurements in the field. Hence, it warrants for comprehensive study for accurate emission estimation from mining sector. Objectives of the study are 1.) Identification of various mining activities contributing air pollutants 2.) Assessing efficiency of mining methods employed in terms of dispersion and impact of air pollutants, 3.) Accurate estimation of total emission and emission factors 4.) Planning control measures and 5.) Improvement and carrying out modelling and simulation exercises for better prediction accuracy of the models for mining sector.	R. Sivacoumar (CSIR National Environmental Engineering Research Institute)	19960000.00	Not Recommended No novelty in the project.
365	SNTMO M/379/2020	Design and development of low cost rare earth metals based bi-functional oxygen electrocatalyst for zinc-air batteries (Duration: 3 Yrs, 0 Mth)	To design and develop low cost robust bi-functional (ORR / OER) oxygen electrocatalysts (rare earth metal based compounds, lanthanum and cerium) for rechargeable zinc air batteries. Investigate the electrocatalytic effects of rare earth metals (lanthanum, cerium and transition metal based oxides) for enhancing the kinetics of the oxygen reduction reaction. Estimate the polarization behavior of zinc cells fabricated with the developed electrocatalyst. Analysis the charge-discharge profiles of zinc-air batteries. Demonstrate a single cell of zinc-air system by utilizing the knowledge gained to design best combination of electro-catalysts.	P. RAGUPATHY (CSIR Central Electrochemical Research Institute)	5990000.00	Not Recommended Project is not thrust area of MoM
366	SNTMO M/380/2020	Development of perovskite based materials using inexpensive RE mixed oxides precursors derived from Indian beach sands for room temperature magnetic refrigeration applications (Duration: 2 Yrs, 0 Mth)	To make the direct use of mixed rare earth oxides (available at Indian Beach sands) as cost effective and efficient raw materials for the development of Perovskite manganite materials for the magnetic refrigeration applications near room temperature in the following way: 1. To develop [REMIX] _{0.67A} 0.33MnO ₃ (A=Sr,Ca,Ba etc...) compounds and probe their magnetocaloric properties aiming to have magnetic transition temperature (TC) between 290K to 310K and magnetic entropy change values (?SM) around 2 J/kg-K under 10 kOe field. 2. Tuning the values of ?SM either by the substitution of other RE elements at the A-site or by defect engineering mechanism to 4 J/kg-K under 10 kOe field and maintain the TC between 290K to 310K. 3. To enhance the ?SM values to 5 J/kg-K under 10 kOe field by maintaining the same TC range via defect engineering mechanism at the A-site. 4. Finally to demonstrate the efficacy of the developed materials for the magnetic refrigerator at room temperature.	Vasundhara Mutta (CSIR Indian Institute of Chemical Technology)	6199270.00	Recommended Unique application, potential for future applications

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
367	SNTMO M/381/2020	Development of rare earth metal related products for the corrosion protection of steel (Duration: 3 Yrs, 0 Mth)	• Utilization of Lanthanum and Cerium products from mine waste / fluid catalytic cracking (FCC) spent catalysts as corrosion inhibitors • Design and development of low concentration rare earth inhibitors for corrosion inhibition study • Synergistic effect of rare earth elements / organic compounds for the value addition of corrosion inhibition property • Lab-scale demonstration of corrosion inhibition of rare earth metal products on steel • Setting up of in-house pipeline flow pilot plant for evaluation of corrosion inhibitions of rare earth minerals • To fulfill the goal of the Mining Industry under Atmanirbhar Bharat by utilizing India's mining waste for the benefit of the corrosion industry	Rakesh C Barik (CSIR Central Electrochemical Research Institute)	5055776.00	Not Recommended No Novelty
368	SNTMO M/382/2020	Rare Metal and Rare Earth (RMRE) Potentiality of Pegmatites in the Southern Part of Karnataka, Dharwar Craton, South India (An integrated Geological, Geochemical and Geophysical Approach) (Duration: 3 Yrs, 0 Mth)	1. Compilation of geological map of granitic pegmatite occurrences in the study area 2. Geological mapping of the pegmatite bodies and surrounding rock types (~15 km on all sides of the pegmatite bodies) 3. Petro-mineralogical classification of pegmatites and their potentiality to host Lithium 4. Geochemical classification of pegmatites based on major, minor, trace and REE elements 5. Delineation of the extension of pegmatite bodies in the sub surface through geophysical signatures. 6. Preliminary inferred resource estimates based on mapping, sampling, geochemistry and geophysical studies.	Suresh Kumar B V (University of Mysore)	26418170.00	Not Recommended Way too simplified objectives. Similar work carried out by GSI.
369	SNTMO M/383/2020	Enhanced oil recovery with the synergy of enzyme nanofluid surfactant combinations from different rock surfaces Optimizing with microfluidic real-time approach (Duration: 3 Yrs, 0 Mth)	1. Procure different rock wafers and oils from the petroleum and oil mines at different sites. 2. Fabrication of microchannels with rock wafers and mimicking the rock surface with lithography technique to develop micromolds in the microchannel. 3. Design different CMC combinations along with the commercially available ones and test it on different rock surfaces and oils to visualize the flow behaviour and its recovery rate of oil with and without CMC. 4. Optimize the CMC to have enhanced oil recovery with the OOIP. 5. Preparing a datasheet with the results obtained for all the parameters in the table and charts form for the opportunity to reduce cost and increasing the efficiency during the recovery process. 6. Prepare transparent microfluidic kits with rock surface patterns and inhouse rock wafers to be used directly at the site and finally provide it for the scientist with this kit working at the oil recovery sites to design their own CMC.	Ponmozhi Jeyaraj (Indore Education and Services Society)	3516000.00	Not Recommended Pertain to Ministry of Petroleum and natural gas.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
370	SNTMO M/384/2020	Recycling utilization of coal mining waste to develop biomass coal pellet based renewable energy for the socio-economic development of India (Duration: 3 Yrs, 0 Mth)	1) To collect coal mining waste and agricultural waste from different part of northeast region 2) To process waste materials for development of coal biomass pellet 3) To mix processed coal and biomass waste in different ratio with different low cost binders to increase calorific value 4) To characterize and analyze coal biomass pellet for establishing different efficacy (environmental, hardness, moisture etc) 5) To modify and fabricate existing portable coal biomass gasifier according to the energy release. 6) To optimize and compare the different coal biomass pellet based electricity generation. 7) To establish a flawless, cost effective coal biomass pellet based power system and maintain power quality with proper voltage current characteristic to the connected load for consumer 8) To promote and organize social awareness programme related to this study.	Saikat Kumar Jana (National Institute of Technology Arunachal Pradesh)	4248644.00	Not Recommended This project does not meet the thrust area of MOM. And pertain to Ministry of Coal
371	SNTMO M/385/2020	Optimizing the valorization of red mud for construction material (Duration: 3 Yrs, 0 Mth)	The aim of the present study is the valorization of red mud as a construction material, as per the 17 sustainability development goals (SDG) of UNO. The present study is to consider red mud as eternal resources, i.e. cradle to cradle (C2C) approach along with carbon dioxide sequestration. The objectives of the present research are (i) To evaluate the mineral and chemical composition of red mud and red mud in combination with fly ash/GGBS that can influence carbon sequestration of the construction material. The effect of pH, size and void space of red mud and mixture to be investigated (ii) Effect of carbonation curing on strength and durability of construction material. To study the carbonation efficiency and measurement of CO2 uptake of devel. (iii) Life cycle assessment of construction material using red mud vis-à-vis natural aggregate for its valorization considering CO2 sequestration through mineral carbonation, and present it as ozone layer depletion and agricultural land use.	SARAT KUMAR DAS (Indian Institute of Technology ISM Dhanbad)	3118760.00	Not Recommended Similar work has been done in past.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
372	SNTMO M/386/2020	Recovery of galena, sphalerite from lead zinc tailings by integrated energy efficient ultrafine comminution and novel shear floc-flotation and its impact on downstream Paste fill (Duration: 3 Yrs, 0 Mth)	1.To characterize the mineralogical, rheological and settling rate information of the lead/zinc tailings including re-grinding fines for a better understanding of feasible beneficiation roots. 2. To explore and study energy efficient fine grinding for the possible liberation of galena, sphalerite, and other minor metals 3. To develop the up-scale novel cyclone design for beneficiating ultra-fine multi-component feed efficiently at industrial capacity 4. To explore a suitable centrifugal separator for recovering maximum heavy density minerals from the ultrafines 5. To recover the galena and sphalerite rich particles by adopting novel ultrasonic treated/conditioned shear floc-flotation processes mainly at rougher-scavenger stages for the required mineral grade enrichment. 6. To develop an optimized process flow-chart for energy-efficient beneficiation of lead-zinc tailings producing smelter grade feed. 7. To develop paste fill application utilizing as received tailings and generat	Narasimha Mangadoddy (Indian Institute of Technology Hyderabad)	7214700.00	Recommended Project provides well defined research methodology and has potential area of fine grinding & recovery of Lead/ Zinc.
373	SNTMO M/387/2020	LiDAR-UAV and TLS for underground mine surveying and improved over ground mining applications (Duration: 3 Yrs, 0 Mth)	Mining sites offer complex terrain information. The difficulty of surveying underground mines is manifold. The information over or under ground are required to be monitored and need processing periodically for efficient mining applications. Ground based technique such as Terrestrial Laser Scanning offers accurate and very dense point cloud, but takes time. UAV can also give good 3D terrain data, however, it falters under the ground. Thus, the research aims- -developing a technique for accurate scanning for the underground mines collecting information of surrounding ground, geological formation, air quality, dust, temperature within the cavity - determination of processing scheme to extract geological and environmental parameters at subsurface environment - establishing fast, simple and accurate schemes for improved over ground mining applications using UAV-LiDAR and TLS	sushambiswas (Rajiv Gandhi Institute of Petroleum Technology)	2421018.65	Not Recommended Limited to specific U/G mines
374	SNTMO M/388/2020	A Noval Acoustic Based Highly Effective Filtration System for Ore and Minerals (Duration: 2 Yrs, 0 Mth)	This proposal focuses on the development of a cost effective and acoustic based new technology for the filtration of Ore and Minerals. This project is based of the fundamental study of micro/nano-floating bodies and its application for filtration. In the industries, often materials to be used for manufacturing come with impurities. Separating them is an essential phase of manufacturing and deals with human involvement which is subjected to its limitation in accuracy. Moreover, only the heavier than and lighter than kind of materials can be separated by the use of conventional methods. A use of acoustic disturbance of surface tension and using the behavior of small objects floating on the interface can create more efficiency and accuracy in the filtering process in industries. So, this proposal is made with this intention to help the industries with the outcome of the data/results gathered in the research.	Avinash Kumar (Indian Institute of Information Technology Design and Manufacturing Kancheepuram)	3588700.00	Not Recommended The research project is of academic interest and does not clearly identify the gap.

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
375	SNTMO M/389/2020	Design and Development of Microplasma Reactor for Efficient Redox Transformation of Toxic Chromium (VI) and Arsenic (III) in Mine Water Effluent (Duration: 3 Yrs, 0 Mth)	1. Design and construction of portable Microplasma reactor for the detoxification of Chromium (Cr) and Arsenic (As) in mine water effluent. 2. Trace and quantify the reactive oxygen species (ROS) and reactive nitrogen species (RNS) generated in the effluent during the plasma treatment. 3. Examine the efficiency of reactive species in the conversion of Cr (VI) to Cr (III) and As (III) to As(V). 4. Complete removal of Cr (III) and As (V) using lignin adsorption. 5. To develop a Pilot scale microplasma array system to treat massive quantity of mine water effluent.	K. SURESH (Bharathiar University)	3073502.00	Not Recommended Project is not thrust area of MOM.
376	SNTMO M/390/2020	Strength on light weight concrete by replacing melamine crushed waste for fine aggregate (Duration: 2 Yrs, 0 Mth)	1.Disposal and re-using of the waste materials of the Melamine Formaldehyde is one of the environmental problems all over the world. As a solution to these negative effects, the literature suggests that the melamine waste can be used in the construction industry as partial percent substitutes for fine aggregate, binder and additives in concrete. 2.SMF are discarded in the nearby land and the natural fertility of the soil is spoiled. To avoid the pollution and reuse the waste material.	M.SHAHUL HAMEED (P S Ramasamy Telugu Minority Educational & Charitable Trust)	2343550.00	Not Recommended Project is not thrust area of MoM as it realtes to construction material.
377	SNTMO M/391/2020	Additive manufacturing of Rare-earth based Nd-Fe-B magnets (Duration: 2 Yrs, 0 Mth)	• Fabrication near net shaped Nd-Fe-B magnets by Additive Manufacturing • To improve the density of additively manufactured Nd-Fe-B magnets • To obtain an anisotropic magnet by magnetic field annealing of the additively manufactured Nd-Fe-B magnet	Raghavan Gopalan (International Advanced Research Centre for Powder Metallurgy and New Materials)	7057770.00	Recommended Upcoming field and future Potential usage
378	SNTMO M/392/2020	NATURAL RUBBER IRON WASTE WOOL COMPOSITES FOR FLEXIBLE LIGHTWEIGHT EMI SHIELDING APPLICATIONS (Duration: 3 Yrs, 0 Mth)	• To give value addition to the waste Iron ore and waste wool for high performance magnetic composites. • Preparation of conductive wool by coating with carbon black. • Preparation of lightweight composites using waste wool/waste Iron ore/natural rubber for EMI shielding applications. • Industrial upscaling of the optimized composite • Publications in peer reviewed journals • Patenting	Nandakumar Kakarikkal (Mahatma Gandhi University Kottayam Kerala)	8855450.00	Not Recommended This project does not meet the thrust area of mom as it realtes to making composite material using, rubber, wool, iron

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
379	SNTMO M/393/2020	Laboratory investigations into creep parameters of rocks (Duration: 2 Yrs, 0 Mth)	The objectives of the study are as follows 1) To collect the rock samples from deep underground mines and caverns 2) Establishing the laboratory facility for testing (RCT-1000 equipment) of Creep behavior of rock samples. 3) To carry out laboratory creep tests on intact rock cores using RCT-1000 equipment as per ISRM standard. 4) Characterisation of the rocks after obtaining the creep parameters for different rocks based on the results of the creep tests.	B H Vijay Sekar (National Institute of Rock Mechanics)	15984688.00	Not Recommended No novelty on the project, similar type of project already approved earlier.
380	SNTMO M/394/2020	Dewatering of Mine Tailings Using Super Absorbent Polymer System (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To prepare a highly cross linked and insoluble non ionic polyacrylamide, anionic highly cross linked sodium salt cross linked polyacrylic acid and a low molecular weight cellulose and high molecular weight polyacrylamide, which can analyse ion exchange capacity of the three systems and the magnitude of zeta potential to understand the strength of the flocs. To study the relation of polymer architecture on the floc strength and minimum dosage required. To analyse the settling time, using dewatering tests and study the polymer adsorption characteristics To understand the regeneration properties of the superabsorbent polymer system using a pH control and temperature controlled system Value addition by publishing in peer reviewed journals and patenting 	Sabu Thomas (Mahatma Gandhi University Kottayam Kerala)	4948500.00	Recommended Project has potential for development of a polyacrylamide for dewatering application in mine tailings.
381	SNTMO M/395/2020	High Rare Earth Elements concentration in the Mahi River tributaries, western India-potential and implications (Duration: 3 Yrs, 0 Mth)	<ul style="list-style-type: none"> To study the spatial distribution and determine the potential reserves of the REE in the Mahi River and its tributaries through detailed prospecting surveys. To understand the role of grain-size and mineralogy on the distribution of REE in the Mahi River and its tributaries To delineate the provenance of the source rocks applying REE proxy, indices values along with major minor and trace element records and also design exploration strategies for REEs from the study region and also its applicability elsewhere. Based on results, reserve estimation may also be looked into and may collaborate with suitable partners to address the issue. 	ANUPAM SHARMA (Birbal Sahni Institute of Palaeosciences)	5112002.00	Not Recommended Similar work being carried out by GSI and AMD.
382	SNTMO M/396/2020	Innovative approach to recover chromite value from low-grade chromite ore, fines and slimes by dry and wet beneficiation technique. (Duration: 2 Yrs, 0 Mth)	<ol style="list-style-type: none"> Process development for dry beneficiation of low-grade chromite ore, slimes & tailings. Recovery of chromite values from low-grade/sub grade (10-30% Cr₂O₃) chromite ores resources by dry beneficiation and by enhanced gravity separation technique. The utilisation of stock piled tailings and slimes (9-20 % Cr₂ O₃) with required Cr₂O₃ content and Cr/Fe ratio for metallurgical and refractory industries. Development of advanced separation techniques by exploiting the combination of gravity, magnetic and efficient air classification processes (Air Classifier, Air Jig, Air Table, Magnetic separators etc.). 	Prasanta Kumar Baskey (CSIR Institute of Minerals and Materials Technology)	7066000.00	Recommended Novel idea for recovering chromite value from low grade ore.

File No.Met4-14/3/2020-Metal IV

S.N.	Project No.	Project Title / Thrust Area / Duration	Objectives	Project Incharge/ Implementing Institution	Proposed Budget (in Rupees)	Remarks
383	SNTMO M/397/20 20	Process development for the recovery of tungsten values from lean grade Indian resources. (Duration: 3 Yrs, 0 Mth)	The flowsheet for the beneficiation of tungsten ore consists of processing the ore by physical methods such as gravity and magnetic separation techniques to recover the concentrate. However, considering the low metal content and the fine dissemination of tungsten bearing minerals in the plant tailings or in the run-of-mine ore, it is usually difficult to get the desired grade of the concentrate. On the other hand, efforts to obtain high-grade concentrate by multi-stage processing lead to losses of tungsten values. There is a need to develop suitable process for the recovery of tungsten values from the lean grade resources. Over time, many new beneficiation equipment and new chemical reagents have been invented. In view of this, advanced beneficiation and extraction studies are needed to update tungsten recovery technology. The main objective of the present proposal is to develop a process flowsheet for the recovery of tungsten values present in the low-grade (0.2% WO ₃) resources.	SHIVAKUMA R ANGADI (CSIR Institute of Minerals and Materials Technology)	7453650.00	Recommended Project envisages recovering the ultrafine Tungsten from mine lean grade ore or gold tailings.