

Minutes of the 18th Project Evaluation & Review Committee (PERC) meeting held under the Chairmanship of Shri Alok Chandra, Economic Adviser, Ministry of Mines on 24th October 2018 at JNARDDC, Nagpur. The list of participants is enclosed in Annexure-A.

1. A total of 48 project proposals were received in the second phase for the year 2018-19. A two-stage review process was adopted to evaluate the proposal for recommendation to Senior Scientific Advisory Group (SSAG). The first stage comprised of preliminary screening of the proposals done by a team of experts constituted by Ministry of Mines. Based on the guidelines as adopted in 14th PERC, the experts conducted pre-screening of the proposals. Out of 48 proposals, 16 proposals covering five areas, namely (i) Geosciences and Exploration, (ii) Mining, (iii) Mineral Processing & recovery from waste, (iv) Metal Extraction (Metallurgical processes) and (v) Alloys, specialty materials and product were short listed for further review in the second stage. These 16 project proposals were presented by the respective PIs and evaluated by the PERC during the meeting at JNARDDC, Nagpur. Furthermore, 4 (Four) projects as recommended by 17th PERC were included in presentation. In addition to the above, 6 (six) ongoing / completed projects were reviewed by the committee. As per the terms of reference of PERC, the concerned members recused themselves, to avoid conflict of interest, from the proceedings from that part of the meeting when project(s) related to their institute(s) was under consideration.

2. The following criteria were given to all experts for detailed evaluation both from proposal as well as during presentations by the PIs. The evaluation criteria was also communicated by email to all PIs who were called for the presentations.

The evaluation was carried out as per criteria given below:

- (i) Is the problem well defined?
- (ii) Does the proposal adequately cover prior work both in the institution and elsewhere?
Is it similar to any earlier work already sanctioned; has the PI done prior work to prove proof of concept before submitting the project or is the project in the early stage itself?
- (iii) Does it address a critical gap in our country's needs and requirements?
- (iv) Is the methodology of work well laid out and doable?
- (v) Are the deliverables well defined ?
- (vi) Is there a translational potential for application / user interface? Can it move to higher TRL?

- (vii) Does the PI and institution have adequate competence to do the proposed research?
- (viii) Is there collaboration with another Lab or institution or industry to enhance the quality and quantum and application potential?
- (ix) Budget: Is the budget correctly done; Is there deficiency or excess ?
- (x) Time duration.
- (xi) Any other comments.

The committee experts present in the 18th PERC meeting were divided into two panels with corresponding expertise, namely (A) Exploration, Geo-Sciences & Mining, extraction, alloys, products & specialty materials and (B) Mineral processing and Recovery waste. This enabled more time for the PIs to make the presentations as well as detailed interaction. Both the panels met together at the end and selected the projects for recommendation to the next level SSAG, or asked the PIs to revise and attempt a resubmission to the next PERC or not recommended at all. The details are given in the succeeding paragraphs.

Recommendation to SSAG

- (i) Recommended with or without changes to next level SSAG **(9 Project Proposals)**
- (ii) To be revised and resubmitted in next PERC **(3 project Proposals)**
- (iii) Not recommended **(8 Project Proposals)**
- (iv) Review report of ongoing / completed projects. **(6 Progress reports)**

3. Based on the detailed review and evaluation, the following **9 (Nine)** Project proposals are being recommended to SSAG with some revisions.

3.1 One of the important aspects that is emphasized in the revision and made mandatory is to reduce the time duration of the projects in certain cases from 3 years to 2 years with rational reduction in budget outlay. In addition, a few other revisions were suggested which are specific for each of the recommended projects to be carried out by the PIs/implementing institutions before being considered for SSAG.

4. The details of recommended projects (nine) and specific recommendations are given hereunder.

1) Project ID: 01/ 18- PERC /2018-19
Project Title: Assessment of Udaipur rock phosphate, low grade potassium feldspar and lignite mine waste for the development of organo-mineral fertilizer formulations
PI: Dr. Praveen Kumar, Head and Principal Scientist (Soil Chemistry and Soil Fertility), Division of Integrated Farming System Email: praveen.kumar@icar.gov.in Mobile No.: +91-9460249988
Implementing Institution: ICAR-Central Arid Zone Research Institute, Near ITI Circle, Jodhpur, Rajasthan – 342 003
Project Cost : Rs.67.7592 lakhs Duration: 3 years
Objectives: To assess potential of Udaipur rock phosphate and low grade feldspar with respect to P and K release in a biological and physico-chemical environment. To test the feasibility of Udaipur rock phosphate, K-feldspar and lignite mine waste for development of different formulations of organo-mineral fertilizer. To study the effect of organo-mineral formulations on agronomic and nutrient use efficiency in major crops
Remarks and Recommendation:
RECOMMENDED
- PI should include details of the existing prom technology and compare with the one being envisaged. Abundant literature is available on application of low grade rock phosphate as part of Organo-mineral fertilizer and this should be discussed too. - Project is recommended for the studies with a revised budget of Rs 25 lakhs for a period of 2 years.

2) Project ID: 02/ 18- PERC /2018-19
Project Title: Bench scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA)
PI: Manoj T. Nimje : Senior Principal Scientist : (HoD Aluminium Electrolysis), JNARDDC, Nagpur
Implementing Institution: JNARDDC, Nagpur
Project Cost : Rs.63.026 lakh
Duration: 18 months
Objectives : Based on in-house laboratory scale (10 g CFA) studies, it is confirmed that extraction of pure silica and aluminium fluoride from coal fly ash is technically possible. Major objective of the project is to study process on bench scale (0.5-1 kg CFA) and to understand various parameters of process, such as Pressure, Temperature
Remarks and Recommendation:
RECOMMENDED
- JNARDDC has successfully done lab studies on extraction of silica and smelter grade aluminium fluoride. - Project is recommended and the PI in the report shall carry out cost benefit analysis for commercialization.

3) Project ID: 04/ 18- PERC /2018-19
Project Title: Characterization and Beneficiation of Lithium Bearing Minerals from Indian Deposits
PI: Dr.Shivakumar I Angadi, Scientist 08763866142 Shivakumar_ism@yahoo.com
Implementing Institution: CSIR-Institute of Minerals & Materials Technology
Project Cost : Rs. 30.03 lakhs Duration: 3 years
Objectives : The main objective of the present proposal is to characterize and beneficiate lithium bearing minerals from a minable Indian deposit as per Geological Survey of India reports.
Remarks and Recommendation:
RECOMMENDED PI informed the details about associated gangue minerals and possibility of physical liberation process in coarse size fraction. Lab studies to be done with revised budget of Rs. 15 Lakhs and within a time period of 1 year. Accordingly, PI will submit the modified proposal to SSAG for consideration with consent letter from concerned mines.

4) Project ID: 7 / 18- PERC /2018-19
Project Title: Development of capacitive deionization technology for uranium and lithium extraction
PI: Professor T. Pradeep Institute Professor IIT Madras, Chennai Telephone: 044-22574208 Email: pradeep@iitm.ac.in
Implementing Institution: IIT Madras, Chennai
Project Cost : Rs. 155.93 lakh Duration: 3 years
Objectives : • Designing and fabrication of the set-up and electrode assembly for the CDI cell capable of handling uranium and lithium. • Treating uranium and lithium contaminated water samples collected from mines and ground water around mines to bring the uranium and lithium level below tolerance limits. • Setting up pilot plant for the demonstration of CDI technology to remove and concentrate uranium and lithium.
Remarks and Recommendation:
RECOMMENDED • PERC advised PI to develop capacitive deionization technology for real mine water which might possibly contain Se (Khetri Copper Mines), Ge & Ga (Rajpur Dariba Pb-Zn Mines). • This part of the activity should be phase-I part of the project with a revised budget of Rs. 30 Lakhs with a time duration of 1 year. Revised proposal for phase-1 to be submitted by PI for consideration of SSAG.

- Phase-II involving scaling up of project shall be considered based on results of Phase-I.

5) Project ID: 12/ 18- PERC /2018-19

Project Title: Integrated Geological, Geochemical and Geophysical studies for the delineation of Chromitite extensions in Nuggihalli Schist Belt and implications for Ni- Cu $\pm$ PGE mineralisation

PI: Dr P.V. Sunder Raju; Principal Scientist

Email: perumala.raju@gmail.com; 09490748152 (O)040-27012446

Dr Sajeed Krishnan Associate Professor Centre for Earth Sciences (CEaS), *Indian Institute of Science*, Bangalore 560 012, India

E-mail: sajeed@iisc.ac.in krishnansajeed@gmail.com Tel: (+91) 80-2293-3404

Implementing Institution: CSIR-NATIONAL GEOPHYSICAL RESEARCH INSTITUTE

Hyderabad, Telangana state, INDIA & *Indian Institute of Science*, Bangalore

Project Cost : Rs. 78.000 lakh **Duration:** 3 years

Objectives :

- Multi-Parameter Geophysical Surveys (Gravity and Magnetic, CSAMT, EM, and Electrical methods) to delineate the mineralized zones.
- To delineate the subsurface structure and identify the concealed chromite mineralization and its extension.
- To characterize the geochemical and geophysical expression of the deposit and alteration footprints for the presence of Ni-Cu and PGE.
- To characterize the mineralogical alteration signature and variations in mineral chemistry.
- A relook on the ultramafic-mafic components of Aladahalli for seeking Ni and PGE associations.
- Antharghatta-Kalangavi areas to the NNW of Arisikere in the northerly extensions of NSB so as to seek chromite and PGE potential at depths.
- Mafic-Ultramafic suites of Kadakola (Tata) and Karya (MML) for possible chromite ores and Ni and PGE.
- The mafic-ultramafic association with chromite in Lalithadripura-Varuna are southeast of Chamundi granite (southerly extensions of NSB) also forms a promising target area for PGE.

Remarks and Recommendation:**RECOMMENDED**

- PI has proposed to undertake Integrated Geological, Geochemical and Geophysical studies for the delineation of Chromitite extensions in Nuggihalli Schist Belt and implications for Ni- Cu $\pm$ PGE mineralization.
- PERC recommended the project with a revised budget of Rs. 60 Lakhs for 2 years.
- Revised proposal to be submitted by PI for consideration of SSAG.

6) Project ID: 15/ 18- PERC /2018-19

Project Title: Treatment of Acid Mine Drainage for Heavy Metal Removal

PI: Dr. Sumit Sinha Ray, Assistant Professor School of Engineering Indian Institute of Technology Mandi Telephone & Mobile No. :+91-1905-267265; +91-

9748159620 E-mail: sumitsinha@iitmandi.ac.in
Implementing Institution: Indian Institute of Technology Mandi, Kamand Campus, VPO Kamand,
Project Cost : Rs. 48.7546 lakh Duration: 3 years
Objectives :
- To evaluate several inorganic and organic media for their ability to remove heavy metals from AMD through physico-chemical processes such as adsorption, precipitation etc., consequently to investigate the performance of PRB employing effective inorganic and organic media for removal of heavy metal from AMD (PART A) - To develop biopolymer filter membrane via <i>Solution Blowing</i> technique to adsorb heavy metals like Cu, Fe, Zn, Mn, Ni, Pb, As etc. (PART B) - And finally, to incorporate membrane filtration scheme with AMD effluent treatment, where the PIs envisage to fabricate a final prototype for AMD treatment. (PART C)
Remarks and Recommendation:
RECOMMENDED - It is recommended that project should be undertaken in two phases. - Phase-1: To establish feasibility of project on lab scale the PI is advised to submit revised budgetary proposal for phase-I with a budget of Rs. 20 Lakhs for a period of one year. - Phase-2 of the project may be considered based on the results of phase-1.

7) Project ID: 17/ 18- PERC /2018-19 (Revised)
Development of graphene based membranes from graphite ore for desalination
Dr. (Mrs). Sreeja Kumari S.S (PI) Scientist, Telephone No: +91471-2515371 (O), Mob: +91 9442217259 E-mail: sreejakumari@niist.res.in , sreejakumariss@gmail.com Mrs. N. Vasumathi, Sr. Scientist, CSIR-NML, Chennai vasumathi@csirmc.res.in
Implementing Institution: CSIR-National Institute for Interdisciplinary Science and Technology, Industrial Estate P.O, Thiruvananthapuram - 695 019. CSIR – NML, Madras Centre, Chennai
Project Cost : Rs. 73.2486 Lakhs Duration: 3 years
Objectives :
- Develop a non-hazardous and non-petroleum based environmentally friendly flotation reagents for beneficiation of low grade graphite ore. - Synthesis of graphene from graphite ore in large quantity (200g/Batch) by indigenous dual drive planetary ball milling and development of graphene based composites. - Optimization of the synthesis technique and precursor materials. The milling critical speed, reaction time and precursor materials will be tune in order to achieve high quality graphene.

- Fabrication of graphene/Graphene Oxide and Functionalized Graphene Oxide membranes. - Studying the desalination performance of the fabricated membranes and comparing with the conventionally used membrane for desalination.
Remarks and Recommendation:
RECOMMENDED
- PI has complied with the remarks of the 17th PERC with regards to submission of proof of concept of graphite beneficiation. - Project is recommended with a revised budget of Rs. 60 Lakhs in 2 years.

8) Project ID: 18/ 18- PERC /2018-19 (Revised)
Recovery of scandium metal from acid leach liquor from titanium mineral industries
Dr. M. SUNDARARAJAN Senior Scientist Telephone No:+91471-2515250(O), Mob: +91 8129075511 E-mail: rajanmsundar77@yahoo.com
Implementing Institution: CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) Industrial Estate P.O, Thiruvananthapuram -695
Project Cost : Rs.63.3293 Lakhs
Duration: 3 years
Objectives :
- Physical and chemical characterisation of titanium leach liquor byproducts from select titanium mineral industries Pre-treatment of the leach liquor for suitable acid concentration, pH and oxidation reduction states of select elements. - Solvent extraction separation of scandium values from the leach solution. - Preparation of high purity scandium oxide and its hydro-fluorination to scandium fluoride. - Calciothermic reduction of scandium fluoride to scandium metal.
Remarks and Recommendation:
RECOMMENDED
- PI has complied with the recommendation of 17th PERC with regards to characterization of the input feed liquor from actual operation and preliminary studies to demonstrate the concentration of scandium in the strip liquor after solvent extraction. - Project is recommended with a revised cost of Rs. 33 lakhs and duration of 2 years. Accordingly, revised proposal to be submitted for consideration of SSAG.

9) Project ID: 20/ 18- PERC /2018-19 (Revised)
Improving fracture resistance of rocks through adhesive bonding for underground mining application
Dr. Rashmi Ranjan Das (PI) Assistant Prof. drrrdas@iitism.ac.in
Implementing Institution: India Institute of Technology (ISM) Dhanbad

Project Cost : Rs.14.73467 Lakhs

Duration: 3 years

Objectives:

- To study the effect of crack orientation angles ($\beta = 300, 450$ and 800) on ultimate fracture load of the granite based rock in absence (F_u) in absence of any polymeric adhesive, which is to be considered as the base parameter for studying effect of adhesive bonded coating on fracture resistance of the rock specimen.
- To determine the load causing the crack to grow (F_g) and the corresponding crack branching angle (θ_c) in a granite based rock specimen with different crack orientation angles (β) = 300, 450 and 800 in absence of any polymeric adhesive. This data would be used for validating the FEM model to be developed for detailed analysis of fracture growth in the rock specimen.
- To study the effect of effect of different types of polymeric adhesive (LOCTITE® FIXMASTER and HIT-RE-500-V3) based coatings with coating parameters: $h_0 = 1$ mm, $2a_0 = 13$ mm, and $2b_0 = 11.5$ mm (Figure 2) on ultimate fracture load of the granite based rock specimen (F_{ua}) with crack orientation angle (β) = 30 degrees.
- This leads to identification of a superior grade of adhesive having better effect on the fracture resistance of the rock specimen measured through the ultimate fracture load of the granite based rock specimen (F_{ua}).
- To study the effect of variation of coating parameters (h_0 : 1 mm, 2 mm and 3 mm, $2a_0$: 13mm, 15 mm, and 17 mm, and $2b_0$: 11.5 mm, 13.5 mm, and 15.5 mm) of the superior adhesive on ultimate fracture load of the granite based rock specimen (F_{ua}) with crack orientation angle (β) = 30 degrees.
- To study the effect of crack orientation angle ($\beta = 300, 450$ and 800) on ultimate fracture load of the granite based rock (F_{ua}) in presence of the superior polymeric adhesive coating ($h_0 = 1$ mm, $2a_0 = 13$ mm, and $2b_0 = 11.5$ mm).

Remarks and Recommendation:

RECOMMENDED

- PI has complied with the recommendation of 17th PERC with regards to including suitable low hardness materials with practical application in mining / civil infrastructure industry. Furthermore, the project objective should be modified to include experiments on rock samples from the coal bearing areas (Jharia), Mineral bearing areas (HZL, HCL) in addition to the rock samples (Shale, Limestone, Sandstone & Granite), so that the outcome of the research shall be useful to mining industry (coal & metal mining sectors).
- Project duration to be reduced to 15 months.
- Recommends the submission of the revised proposal to SSAG for consideration.

5.0 Projects to be resubmitted to next PERC

The following 3 (THREE) projects to be resubmitted with revision to next PERC:-

1) Project ID: 08 / 18- PERC /2018-19
Project Title: Development of Novel Nanoporous hollow Fibre membrane based unit for the effective treatment of Mine waste water
PI: . Prof. Arun M. Isloor Membrane Technology Laboratory, Prof & Head of Department, Department of Chemistry E-mail : isloor@yahoo.com Ph : 9448523990
Implementing Institution: National Institute of Technology Karnataka, Surathkal, Mangalore
Project Cost : Rs. 29.96075 lakh Duration: 3 years
Objectives :
• In-house fabrication of polysulfone based hollow fiber nano filtration membranes& their characterization • Fabrication of cartridges of above pre chactrepared nano filtration membranes • Filtration of the waste and contaminated water collected from mines i.e. M/s Hutti Gold Mine Co. Ltd., Iron ores of M/s NMDC at Donimali and Bailadilla, Uranium Corporation India Limited and few other mines (like Iron ore mines in Bellari area, Underground and open cast Copper mines) using above cartridges . • Developing a mobile pilot plant prototype of filtration unit for treating mine waster and its commercilization of the pilot plant
Remarks and Recommendation:
Recommended for resubmission to next PERC with following changes. :
• Project duration should be 18 months. • Detailed characterization of mine water from different mine sources to be included in project proposal. • PI should visit CIMFR and discuss with the concerned scientists on the work being already being carried out in the coal mines on the subject and to visit HCL, Jharia coal field, Hutti mine, etc to understand the problem and seek collaboration to make it more practical.

2) Project ID: 09/ 18- PERC /2018-19
Direct production of Fe-Cr-Ni-Mn stainless alloy from mine waste by thermal plasma process
Dr. A.K. Chaubey Principal Scientist Tel: (0674) 2379204 (O), 09438090232(M) E-mail: akchaubey@immt.res.in , anil.immt@gmail.com
Implementing Institution: CSIR-Institute of Minerals & Materials Technology Bhubaneswar
Project Cost : Rs. 65.991 lakh

Duration: 3 years
Objectives :
The aim and objective of present proposed work is to produce Fe-Cr-Ni-Mn crude stainless steel alloy directly from the low graded chromite, nickel laterite and manganese ores by plasma smelting.
Remarks and Recommendation:
Recommended for resubmission to next PERC with following changes. :
- PI should include specific type of mine (chromite, nickel etc) for the project studies. - Value addition of waste generated during process (non yield material-after process) should be explored.

3) Project ID: 19/ 18- PERC /2018-19 (Revised)
Synergistic Treatment of Wastewater Using Nanomaterials and Algal Technology and its Feasibility Studies: Focus towards Mining Industry
Kiran Bala (Dr., Mrs.) Assistant Professor Tel: +91-7324306585 E-mail: kiranb@iiti.ac.in
Implementing Institution: Discipline of Biosciences & Biomedical Engg., IIT Indore
Project Cost : Rs. 99.50 lakh
Duration: 3 years
Objectives :
- Screening and selection of algal species from mine environment - Investigation of algal response in simulated/actual mine wastewater - Optimization of process parameters to improve the treatment/metal accumulation efficiency - Synthesis of different kinds of nanoparticles which could enhance the binding contaminants - Characterization and Functionality testing - Evaluation of nano particulate systems to aid algal system to remove the contaminants in wastewater from mines.
Remarks and Recommendation:
17th PERC had recommended specific modifications to the proposal. However, the PI has resubmitted the proposal alongwith a collaborator (IIMT, Bhubaneswar) with significant work responsibilities. - The PI is advised to resubmit the proposal as an inter-institutional collaborative project to next PERC.

6.0 The list of 8 (eight) projects NOT RECOMMENDED is as below:-

These proposals were not recommended as the (i) objectives are very sketchy and methodology not clear or doable; (ii) proposals not directly in the thrust areas, (iii) outcomes are not relevant or impactful, (iv) there is no visible translational potential; (v) similar projects have already been funded, (vi) it could be directly done as a consultancy project with the industry; (vii) preliminary proof of concept is not done; (viii) the proposed work can be done by PI within the facilities available with them and it does not really need a project proposal; (ix) in a few cases PI has not adequate domain knowledge in mining or minerals or lacking a partner with domain knowledge, (x) casual approach to problem definition and a loose connection made between mining, minerals and waste.

1) Project ID: 14/ 18- PERC /2018-19
Microwave assisted reduction of Ilmenite: An innovative approach for control of fines generation and maximization of solid-liquid separation
Dr. K. JAYASANKAR (PI) Senior Scientist, Minerals & Metallic Materials Section Materials Science & Technology Division LANDLINE : 0471-2515313 Mobile: +91-9778060563, Email: jayasankar@niist.res.in
Implementing Institution: CSIR-National Institute for Interdisciplinary Science & Technology Thiruvananthapuram
Project Cost : Rs. 40.9 lakh Duration: 2 years
Objectives :
To develop the microwave assisted Process Intensification for ilmenite reduction and it will lead to management of fines generation during processing of ilmenite for maximizing solid-liquid separation and also aims at enhancing efficiency of hydrocyclone separation of iron oxide and ilmenite.
Remarks and Recommendation:
NOT RECOMMENDED
Benefits in terms of reduction of cost, simplification of process, etc. by using microwave process is not clear.

2) Project ID: 03/ 18- PERC /2018-19
Project Title: Catalytic precipitation of aluminium hydroxide from Bayer liquor using metal organic frameworks
Mr. R.J. Sharma, Senior Principal Scientist, Alumina Division Jawaharlal Nehru Aluminium Research Development and Design Centre, Wadi, Amravati Road, Nagpur. email: rjsharma@jnarddc.gov.in, sharmarj@hotmail.com, Phone: 9158931391

Implementing Institution: Jawaharlal Nehru Aluminium Research Development & Design Centre, Nagpur
Project Cost : Rs. 58.31 Lakhs Duration: 2 years
Objectives :
New process development in precipitation • Explore the possibility of using metal organic framework to enhance the yield. • To reduce the energy consumption by establishing parameters to produce alumina hydrate • Study the kinetics/ mechanism of precipitation with respect to seed surface property by using metal organic framework (MOF) • Comparison of precipitation kinetics with conventional seed with and without MOF. • To study effect of ultrasound in catalytic precipitation using MOF • To study ultrasonic precipitation kinetics for understanding catalytic precipitation mechanism using metal organic framework
Remarks and Recommendation:
NOT RECOMMENDED
PI was absent.

3) Project ID: 5/ 18- PERC /2018-19
Project Title: Continuousfeeding friction stir processing tool for the development of new functionally graded alloy
PI: Dr. Murshid Imam (PI) Assistant Professor, Department of Mechanical Engineering Email: murshid@iitp.ac.in Contact No. :0612-302-8699 (O), +919523726846 Dr. Viswanath Chinthapenta (Co-PI) Assistant Professor, Department of Mechanical Engineering Email: viswanath@iith.ac.in Contact No. : +040-2301-7098 (O), +91 8790128695
Implementing Institution: Indian Institute of Technology Patna & Indian Institute of Technology Hyderabad
Project Cost : Rs.56.462 lakhs Duration: 3 years
Objectives :
1. Density based separation using organic liquids a. To generate float – sink data reflecting density – grade distribution b. to estimate the operating cut densities of the beneficiation equipment 2. Developing a standardized procedure for the sink – float test-work of iron ore and and other high density minerals. 3. Application of knowledge of density – grade distribution and operating cut density to beneficiate iron ore fines and tailings spirals and Wilfley table 4. If necessary to do the design improvement of spirals and Wilfley table
Remarks and Recommendation:
NOT RECOMMENDED

- There is no clarity on objectives of the proposed work.

4) Project ID: 6/ 18- PERC /2018-19

Project Title: Development of Aluminum-Titanium Master Alloys and In-situ composites using Intermediates of Titanium Mineral Processing Plants

PI: Dr.T.P.D. Rajan Principal Scientist, Minerals and Metallic Materials Section, Materials Science and Technology Division, CSIR- National Institute for Interdisciplinary Science and Technology
Industrial Estate P.O., Trivandrum- 695019, Kerala
Email: tpdrajan@gmail.com, tpdrajan@niist.res.in
Ph: 0471-2515327 / 9447035439 (M), Fax: 0471-2491712

Implementing Institution: CSIR- National Institute for Interdisciplinary Science and Technology, Trivandrum

Project Cost : Rs.37.91496

Duration: 2 years

Objectives :

The goal of the project is developing the Aluminum titanium master alloy and in-situ composites containing Ti and also other minor additions of Zr and RE additions using Titanium mineral processing industrial intermediates by cost effective methodologies and in-situ reactions. Most of the Al master alloys are very critical materials added to commercial alloys to enhance the properties through grain refinement and strengthening precipitate formations. The project will be carried out using the mineral processing industrial intermediates from Travancore Titanium Products.

Remarks and Recommendation:**NOT RECOMMENDED**

- Project is not recommended at this stage. PERC has advised to carry out aluminothermic reduction experiment on TiO_2 .
- Project would be considered only if the encouraging results are demonstrated.

5) Project ID: 10/ 18- PERC /2018-19

Project Title: Environmental and Social Risk Assessment Tool for Exploration and Mining Projects

PI: Sanket Bhale Associate Director – Sustainable Business
World Wide Fund for Nature (WWF) India
sanketb@gmail.com, +919811581380

Implementing Institution: World Wide Fund for Nature (WWF) India , 172-B, WWF India, Max Mueller Marg, Lodhi Estate, New Delhi - 110003

Project Cost : Rs.59.625 lakhs

Duration: 2 years

Objectives :

To develop a knowledge product for avoiding / minimizing environmental and social risks to and from mining projects

Remarks and Recommendation:**NOT RECOMMENDED**

- Modalities of data integration not clear.

6) Project ID: 11/ 18- PERC /2018-19
Exploration for Rare Earth Elements (REE) and Gallium (Ga) in selected bauxite-laterite soil profiles of India
Dr. BULUSU SREENIVAS Principal Scientist, LAM-MC-ICP-MS Laboratory Institution with Address CSIR-National Geophysical Research Tel:040-23434700 (2461 Extn.) E-mail : bsreenivas@ngri.res.in
Implementing Institution: CSIR-National Geophysical Research Institute, Hyderabad 500007
Project Cost : Rs. 2.475 crores
Duration: 3 years
Objectives :
• To assess the mobility and enrichment of REE in selected bauxite laterite soil profiles of India. • Critical appraisal of geochemical controls of HREE enrichment in potential profiles.
Remarks and Recommendation:
NOT RECOMMENDED
• No proper preliminary groundwork seems to have been carried out to justify the project.

7) Project ID: 13/ 18- PERC /2018-19
Project Title: Investigation of High Wear Resistant, Thickness, Low Porosity Thermal Spray Coatings for Centrifugal Slurry Pump
PI: Dr. Bharatkumar Mohanbhai Sutaria, Associate Professor, Mechanical Engineering Department, Sardar Vallabhbhai National Institute of Technology, Mobile-09427421615, E-Mail: bms@med.svnit.ac.in .
Implementing Institution: DEPARTMENT OF MECHANICAL ENGINEERING SARDAR VALLABHBHAINATIONAL INSTITUTE OF TECHNOLOGY SURAT-395007, GUJARAT, INDIA.
Project Cost : Rs. 28.45400 lakh: Duration: 3 years
Objectives :
• Study of the slurry pump wears characteristic in mining applications and strategy to mitigate it. • Design and development of the Coriolis wear tester based on the requirement of particle size distribution, the concentration of slurry, slurry velocity and variable particle impingement angle. • Development of the high thickness, low porosity, and high hardness thermally sprayed coating for slurry wear resistance in the centrifugal slurry pump. • Prediction of the wear in the slurry pump to properly maintain and service to

decrease the downtime.
Remarks and Recommendation:
NOT RECOMMENDED
Does not deal with the issues/problems relevant to this Ministry.

8) Project ID: 16/ 18- PERC /2018-19
Project Title: Ultrasound-based Technique for the Measurement of the multi-Layer Liquid Depths at high temperature
PI: Dr. Randhir Singh (PI) Assistant Professor Department of Metallurgical Engineering, Indian Institute of Technology BHU, Varanasi Email: randhir.met@itbhu.ac.in Tel:+91-8093919229
Implementing Institution: Indian Institute of Technology Varanasi
Project Cost : 46.35 Lakhs
Duration: 3 years
Objectives :
- To develop an alternative to the existing, dipstick-based liquid level measurement with a new method this is fast, accurate and is less-intrusive. - The proposed method would enable a better process control hence, a better product quality and efficiency
Remarks and Recommendation:
NOT RECOMMENDED
Not enough groundwork has been done to establish the feasibility of proposed technology for real aluminium cell.

REVIEW OF ONGOING / COMPLETED PROJECTS – 6 NOS.

The following 6 (six) projects were reviewed by the PERC.

1)
Project Title: Geochemical studies of the archaean greenstone belts of the aravallicraton, Northwestern Indian shield” Implication for crustal evolution and economic potential
PI: Prof. Md. Erfan Ali Mondal, Erfan.mondal@gmail.com
Implementing Institution: Aligarh Muslim University, Aligarh
Duration: 2 years F.No. 14/4/2016-Metal IV
Date of SSAG approval: 47th SSAG dt.23.8.2016
Total cost: Rs. 22.321 lakh 1st installment: Rs. 11.716 lakh dt19.10.2016
Remarks and Recommendation:
• PERC noted that the project work was initiated in Feb-2018 while the project was actually sanctioned in Oct-2016. • PERC however found that the progress of work of last 6-8 months has been quite satisfactory and has potential for further exploration. • The PI has been advised to submit the utilization certificate and expenditure statement based on expenditure made so far out the grant already released to him. After taking into consideration already committed expenditure, PI should return the balance amount with interest to Ministry. • Based on utilization certificate and final project report further release of grant would be considered (as applicable)

2)
Project Title: Synthesis, characterization and photocatalytic performance of metal doped semiconductor nanomaterials
PI: Dr. M. Muneer readermuneer@gmail.com
Implementing Institution: Aligarh Muslim University, Aligarh-202002
Duration: 3 years (F.No. 14/28/2014-Met.IV)
Date of SSAG approval: 45th SSAG dt 4.12.2014
Total cost: Rs. 28.5375 lakh 1st installment: Rs. 19.5285 lakh dt 29.12.2014 2nd installment: Rs. 4.3785 lakh dt 18.2.2016. 3rd installment: Rs. 4.16745 lakh dt 28.9.2017
Remarks and Recommendation:
• Although reasonable amount of the work has been done in the project, final project report is not acceptable in its present form. • PI is advised to submit revised project report clearly highlighting objectives, deliverables, and future action to take work forward for commercial application.

3)
Project Title: Mineralogical and geochemical characterization of Indian glauconites for alternative potassium fertilizers (Ongoing)
PI: Prof. Santanu Banerjee Department of Earth Sciences, Indian Institute of Technology Bombay, Mumbai Email: Santanu@iitb.ac.in
Co-PI: Dr P.V. Sunder Raju; Principal Scientist Email: perumala.raju@gmail.com ; 09490748152 (O)040-27012446
Implementing Institution: Indian institute of Technology, Bombay and CSIR-NATIONAL GEOPHYSICAL RESEARCH INSTITUTE, Hyderabad, Telangana state, INDIA
Duration 3 year F.No. 14/77/2015-Metal IV
Date of SSAG approval: 46th SSAG dt 2.12.2015
Total cost: Rs. 55 lakh [Rs. 27.5 lakh (IIT Bombay), Rs. 27.5 lakh (NGRI Hyderabad)]
1st installment: Rs. 12.5 lakh (IIT Bombay), Rs. 12.5 lakh (NGRI Hyderabad) Dt 29.2.2016
2nd installment: Rs. 7.5 lakh (IIT, Bombay) & Rs. 7.5 lakh (NGRI) dt 29.9.2017
Remarks and Recommendation:
• PERC advised magnetic separation at IBM pilot plant. • IBM is requested to facilitate the experimental work. • Project duration extended up to 31st Dec 2019 without any cost escalation.

4)
Enhanced recovery of Manganese as electrolytic manganese dioxide (EMD) from ferro manganese mine tailings through bioleaching
PI: Dr. Sanghamitra Nayak, Principal Investigator sanghamitran24@gmail.com
Implementing Institution: Siksha O Anusandhan University, Khandagiri, Bhubaneswar
Duration: 3 year (F.No. 14/8/2015-Metal IV)
Date of SSAG approval: 46th SSAG dt 2.12.2015
Total cost: Rs. 30 lakh
1st installment: Rs. 12.39108 lakh dt 14.3.2016, Rs. 4.20892 lakh dt 29.7.2016 (balance of 1st instt)
Remarks and Recommendation:
REVIEW :
• PI presented the progress of the project. It also included the details of 3 papers published in journals. • The report should include end use, cost analysis study for cost effective recovery of manganese. • Next tranche of funds is recommended for release subject to submission of utilization certificate and expenditure statement.

5)
Development of super thermal aluminium (STAL) conductor for Indian power sector JNARDDC Nagpur & NFTDC Hyderabad (Jointly)
Mr. R.N. Chouhan Scientist –III (JNARDDC) & Mr. D. LokeswaraRao, Dy Project Director NFTDC rnchouhan@jnarddc.gov.in
Implementing Institution: JNARDDC, Nagpur
Duration: 3 years (F.No. 14/20/2013-Metal IV)
Date of SSAG approval: 44th SSAG dt.18.12.2013
Total cost: Rs. 495.40 lakh [Rs. 226 lakh (JNARDDC, Nagpur) and Rs. 269.40 lakh (NFTDC, Hyderabad)] 1st installment: Rs. 10 lakh (JNARRDC) and Rs. 10 lakh (NFTDC) dt 13.1.2014 & Rs. 56 lakh (JNARDDC) Rs. 64 lakh (NFTDC) dt. 13.8.2014, 2nd installment: Rs. 112 lakh to JNARDDC & Rs. 124 lakh to NFTDC dt 15.7.2015, 3rd installment: Rs. 43.2 lakh (JNARDDC) &Rs. 63.90 lakh (NFTDC) dt 29.8.2016
Remarks and Recommendation:
PERC appreciated the work carried out by JNARDDC & NFTDC in developing the Super Thermal Aluminium (STAL) conductor for Indian Power Sector. The developed alloy was demonstrated before PERC. The final report was accepted and both JNARDDC and NFTDC were advised to submit a combined final report. Balance of final installment will be released after receipt of the combined report and submission of utilization certificate and statement of expenditure.

6)
Purification of commercial rare earth oxides, e.g. Ceria, by molten salt fusion and recrystallization
B.R.V. Narasimhan (PI) and D. Lokeswara Rao (CoPI)
Implementing Institution: Non ferrous Materials Technology Development Centre Kanchanbagh ,Hyderabad
Project Cost : Rs. 108.28 lakh 1st installment: Rs. 68.35 lakh dt 16.12.2014, 2nd installment: Rs. 35.93 lakh dt 4.7.2016 Duration:2 years F.No.14/8/2014-Metal IV Date of SSAG approval: 45th SSAG dt. 4.12.2014
Remarks and Recommendation:
- PERC appreciated the work carried out in this project and final report was accepted. - PERC suggested NFTDC to consider organizing a workshop and interact with industry organization, etc to know the end user. - Recommended to release balance of final installment on submission of utilization certificate and statement of expenditure.

The PERC meeting concluded with thanks to the chair and the experts.

ANNEXURE A

**LIST OF PARTICIPANTS OF 18TH PERC MEETING HELD AT JNARDDC,
NAGPUR
ON 24TH OCT 2018**

Sr no	Name	Portfolio
1.	Shri Alok Chandra Economic Adviser (Mines), New Delhi	Chairman
2.	Dr. J. Bagchi Director (Technical) , Mines, New Delhi	Member
3.	Prof S.P. Mehrotra IIT, Gandhinagar	Member
4.	Prof. T.C. Rao Ex. Director, RRL Bhopal	Member
5.	Dr. A. Agnihotri Director, JNARDDC & NIMH	Member
6.	Dr. H.S. Venkatesh Director, NIRM	Member
7.	Shri Rajendra Singh Chief Scientist & Head, CIMFR, Dhanbad	Representative Member
8.	Shri S.K. Bhattacharya Director (Mining), HCL, Kolkata	Representative Member
9.	Shri Subrat Kar GM (R&D), NALCO	Representative Member
10.	Shri C.K. Thoolkar GM (GS), MECL, Nagpur	Representative Member

Leave of absence granted to other members.