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Minutes of Review meeting of PERC (Project Evaluation & Review Committee) held under the Chairmanship of Shri Satendra Singh, Joint Secretary, Ministry of Mines on 21-22 January 2020 at JNARDDC, Nagpur. The list of participants is enclosed in Annexure-A.

1. A total of 35 ongoing projects were considered for review by the PERC. 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 committee of experts present in the review meeting were divided into two panels with corresponding expertise. Panel-A covering the areas of (i) Geosciences and Exploration (ii) Mining and (iii) Mineral Processing & recovery from waste. Panel-B covering the field of (iv) Metal Extraction (Metallurgical processes) and (v) Alloys, specialty materials and product. 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 finalized the recommendation. 4 (four) PIs were absent. The details are given in the succeeding paragraphs.

1

F. No.	14/4/2016-Met.IV		
Project Title	Geochemical Studies of the Archaean Greenstone Belts of the Aravall I Craton, Northwestern Indian Shield: Implications for Crustal Evaluation and Economic Potential” for financial assistance		
Institution	Aligarh Muslim University, Aligarh		
Principal Investigator	Shri Md. Erfan Ali Mondal, E-mail:- erfan.mondal@gmail.com		
SSAG Approval	47 th SSAG dated 23.08.2016		
Project Cost & Duration	Rs. 22.321 lakh 2 years		
Funds Released		Amount	Date
	1 st installment	Rs. 11.716 lakh	19.10.2016
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> PI has studied only mafic rocks. Studies not carried out in right direction. Timeframe targets not achieved. Objectives not met. Considering the current situation PERC recommended to close the project and submit the final report. Unspent balance should be refunded to Govt of India along with UC and statement of expenditure. 			

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F. No.	14/8/2015-Met.IV		
Project Title	Enhanced recovery of Manganese as electrolytic manganese dioxide (EMD) from Ferro manganese mine tailings through bioleaching		
Institution	Siksha O Anusandhan University, Bhubaneswar		
Principal Investigator	Dr. Sanghamitra Nayak, Email :- sanghamitran24@gmail.com		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 30 Lakhs 3 Years		
Funds Released		Amount	Date
	1 st installment	12.39108 lakh	14.3.2016
	Balance of 1 st installment	4.20892 lakh	28.7.2016
	2 nd installment	5.10lakh(part)	28.11.2018
REMARKS/SUGGESTION : PI WAS ABSENT.			

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F. No.	14/51/2014-Met.IV		
Project Title	Development of Nickel containing steel from chromite over burden		
Institution	Indian Institute of Technology, Kharagpur and Institute of Minerals & Materials Technology, Bhubaneswar (Jointly)		
Principal Investigator	Prof. Siddhartha Das, Email:- sdas@metal.iitkgp.ernet.in Dr. B. Bhoi, E-mail:-bbhoi@immt.res.in		
SSAG Approval	45 th SSAG dated 04.12.2014		
Project Cost & Duration	Rs. 107.6214 lakh 3 Years		
Funds Released	IMMT	Amount	Date
	1 st installment	26.8638 lakh	15.12.2014
	2 nd installment	11.7138 lakh	28.9.2017
	IIT Kharagpur	Amount	Date
	1 st installment	26.901 lakh	15.12.2014
	2 nd installment	16.401 lakh	28.9.2017

REMARKS/SUGGESTION :

1. PI was asked to perform cost evaluation of technology developed.
2. Project work has been completed and final report to be submitted to Ministry.
3. PERC advised the PI and IMMT to compile all previous works related to Sukinda Nickel and Chromite over burden (COB).
4. Also prepare a vision document/ roadmap as part of Final Report.
5. Balance funds to be released subject to submission of utilization certificate and statement of expenditure.

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F. No.	14/75/2015-Met.IV		
Project Title	Rare earth mineral concentration in the beach sands of uttarakannada coast: their economic viabilities and sustainable mining		
Institution	SDM college of Engineering & Technology, Dhavalagiri, Dharwad		
Principal Investigator	Dr. V. S. Hegde, Email:- vshegde2001@gmail.com		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 29.44 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	18.20560 lakh	29.12.2015
	2 nd installment	2.20 lakh(part)	27.2.2019
REMARKS/SUGGESTION : PI WAS ABSENT.			

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F. No.	14/22/2015-Met.IV		
Project Title	Simulation of simultaneous rock fractures at multiple scales		
Institution	IIT Delhi (project transferred from Birla Institute of Technology and Science, Pilani)		
Principal Investigator	Shri Gaurav Singh, Email:- gsingh@am.iitd.ac.in		
SSAG Approval	46 th SSAG dated 02.12.2015		

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Project Cost & Duration	Rs. 30 Lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	13.30 lakh	10.3.2016
	2 nd installment	7.79879 lakh (part)	28.9.2017
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. The objectives are achieved and closure requested by PI. 2. Final Technical Report circulated. 3. PI was advised to submit one page summary including input required, type of rock, isotropic identification etc. 4. No further funds have been sought by PI. 5. Final report of the project is recommended for acceptance and closure of the project. 			

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F. No.	Met4-14/12/2017		
Project Title	Critical Mineral (non-fuel) Resources Index of India- for effective policy decisions on mineral and manufacturing sector of India		
Institution	Council of Energy Environment and Water(CEEW), Thapar House, Janpath, New Delhi		
Principal Investigator	Shri Vaibhav Gupta, Email:- vaibhav.gupta@ceew.in		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 36.29115 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	12.10lakh	16.3.2018

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F. No.	Met4-14/3/2017		
Project Title	Development of a novel underground mining method for exploitation of Chromite deposits from friable orebody and host rocks of Sukinda Valley, Odisha		
Institution	Department of Mining Engineering, IIT, Kharagpur		
Principal Investigator	Shri Abhiram Kumar Verma, E-mail:- akverma@mining.iitkgp.ac.in , abhiram.verma@gmail.com		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 68.46 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	36.15 lakh	24.1.2018
REMARKS/SUGGESTION:			
<ol style="list-style-type: none"> 1. Panel suggested to give a presentation of one year work done to steel company and OMC (Odisha Mining Corporation) and reorient the methodology. 2. PI should submit minutes of the above meeting to Ministry within 3 months. 3. Next instalment to be released subject to submission of utilization certificate and statement of expenditure. 			

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F. No.	Met4-14/7/2017		
Project Title	Processed Sea sand for construction and other purposes		
Institution	Civil Engineering Department, Saveetha Engineering College, Saveetha Nagar, Thandlam, Chennai		

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Principal Investigator	Shri Sudharson G, E-mail:-sudharson@saveetha.ac.in,		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 40 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	30 lakh	26.3.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> PI was advised to carry out the following activities - <ul style="list-style-type: none"> Sand Size distribution study as per CPW standards. Study the chemistry of river, sea sand and fused material. Overall economics of project. Collect different areas (5-6 locations) sea sand and study their size distribution and chemical composition. Bond work Index to be studied. Based on the request of PI, PERC recommended for time extension of 3 months. 			

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F. No.	Met4-14/5/2017		
Project Title	Urban Li Battery Mining: Physio-Chemical separation of used Li ion Batteries for Recovery of Li, Co, Ni active materials and Cu, Al Metal		
Institution	Nonferrous Materials Technology Development Centre, Hyderabad		
Principal Investigator	Shri D. Lokeswara Rao, E-mail:- lokesh@nftdc.res.in		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 83.82 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	59.91 lakh	20.2.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> PERC appreciated the achievements of the project. PI advised to submit one page write-up to Ministry highlighting salient features of project achievements. PI has submitted the final report. Final report of the project is recommended for acceptance and closure of the project. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	Met4-14/11/2017		
Project Title	Development of Metal-Graphene Alloys, Department of Materials Engineering		
Institution	Indian Institute of Science, Bangalore		
Principal Investigator	Dr. Chandan Srivastava, E-mail:- csrivastava@materialsiiisc.ernet.in , csrivastava@iisc.ac.in		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 20 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	10 lakh	22.3.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> PI was advised to develop a product for applications from the metal graphene systems developed. Battery applications were not explored. 			

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3. Comparison of energies required to produce multi-component graphene composites for water oxidation and conventional method used for water oxidation.
4. Is G-ZnO better electrochemical sensor compared to other sensors available in the market?
5. Fe-G, Co-G & Ni-G systems were not investigated.
6. PERC recommends 9 months time extension in collaboration with a strategic partner, NFTDC and IIT Bhubaneswar (DST- MECSP Centres)
7. Next instalment to be released subject to submission of utilization certificate and statement of expenditure.

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F. No.	Met4-14/9/2017		
Project Title	Value added electrochemical Devices from Zircon obtained from Beach Sands of Odisha		
Institution	Indian Institute of Technology, Bhubaneswar		
Principal Investigator	Dr. Soobhankar Pati, E-mail:-spati@iitbbs.ac.in		
SSAG Approval	48 th SSAG dated 20.11.2017		
Project Cost & Duration	Rs. 36.04 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	29.425 lakh	22.3.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PERC appreciated the progress in the project. 2. PI is advised to manufacture around 10 sensors. 3. PERC recommends for 6 months time extension (Sept 2020) for optimization without any cost escalation. 4. Next instalment to be released subject to submission of utilization certificate and statement of expenditure. 			

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F. No.	Met4-14/18/2018		
Project Title	Investigation of the dynamics & mechanism of flocculation by polymers and biopolymers for separation of solid particles of high rate thickeners in mineral processing industries		
Institution	CSIR- National Institute for Interdisciplinary Science and Technology		
Principal Investigator	Dr. Lakshmi Rakesh Kumar Yasarla, E-mail:-yasarla.rakesh@gmail.com		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 42.61 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	22.433 lakh (part)	28.9.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PERC noted that PI has developed a process on commercially available polymer sustained at 60°C 2. Specific gravity to be checked by the PI 3. One page write-up should be submitted by Director, NIIST to Ministry within one month giving details of the process developed for biodegradable polymer to be patented. 4. Next instalment to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	Met4-14/8/2018
Project Title	Use of Overburden Clay as alternate for aggregate

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Institution	Indian Institute of Technology Madras Chennai		
Principal Investigator	Dr. K. Ramamurthy, E-mail:-vivek@iitm.ac.in		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 173 lakh (MoM – 70 + NLCIL-103) 3 Years		
Funds Released		Amount	Date
	1 st installment	35 lakh (part)	30.10.2018
	2 nd installment	-	-
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI was advised to submit one page write-up including proportion of sand: clay for different benches, characteristics of sand, if it meets specification in construction, chemical characterisation of clay for different applications. 2. PERC suggested the PI to meet Neyveli personnel and make one page minutes. 3. Next instalment to be released subject to submission of utilization certificate and statement of expenditure. 			

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F. No.	Met4-14/14/2018		
Project Title	High performance of rare earth metal as Electrode material for super-capacitor application and fuel cell		
Institution	Velammal Institute of Technology, Panchetti, Chennai		
SSAG Approval	49 th SSAG dated 31.07.2018		
Principal Investigator	Dr. V. Sindhu, E-mail:- sindhusrini@gmail.com		
Project Cost & Duration	Rs. 30.96944 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	23.73054 lakh (part)	27.12.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI was advised to design and fabricate a super-capacitor device, benchmark the device and was asked to compare with other super-capacitor materials. 2. PI was asked to carry out techno-economic assessment of the device for scalability and applications. 3. PI should explore strategies for obtaining solutions for fast-charging followed by slow discharge. 4. Next instalment to be released subject to submission of utilization certificate and statement of expenditure. 			

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F. No.	Met4-14/15/2018		
Project Title	Development of open cell aluminium foams for heat sink and EMI shielding Application		
Institution	Advanced Materials and Processes Research Institute (AMPRI), Bhopal		
Principal Investigator	Dr. D. P. Mondal, E-mail:-mondalp@yahoo.com		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 21 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	4.72 lakh (part)	16.10.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. Application of foams in electronic circuits is not viable 			

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2. PI was advised to design and manufacture a heat transfer element (HTE)
3. PI was advised to set-up a test bed for measuring heat evacuation.
4. PI advised to complete the project by Oct 2020.
5. Next instalment to be released subject to submission of utilization certificate and statement of expenditure.

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F. No.	Met4-14/23/2018		
Project Title	Assessment of Udaipur rock phosphate, low grade potassium feldspar and lignite mine waste for the development of organo-mineral fertilizer formulations		
Institution	ICAR- Central Arid Zone Research Institute, Near ITI Circle, Jodhpur, Rajasthan		
Principal Investigator	Dr. Praveen Kumar, E-mail:-praveenkumar@icar.gov.in		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 24.9225 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	7.875 lakh (part)	31.12.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI was advised to discuss with Rajasthan State Mines & Minerals Ltd. (RSMML) about salient features of the proposed fertilizer over conventional fertilizer and submit minutes to Ministry within 3 months. 2. PERC suggested to study pH of Udaipur soil and analyse how micro-organisms are affected. Size fraction study to be done for optimization. 3. Next instalment to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	Met4-14/27/2018		
Project Title	Integrated Geological, Geochemical and Geophysical studies for the delineation of Chromitite extensions in Nuggihalli Schist Belt and implications for Ni-Cu+-PGE mineralization		
Institution	CSIR- National Geophysical Research Institute and IISC, Bangalore		
Principal Investigator	Dr. P. V. SunderRaju E-mail:-perumala.raju@gmail.com Dr. Sajeev Krishnan, E-mail:-krishnansajeew@gmail.com		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 60 Lakh 2 Years		
Funds Released		Amount	Date
	NGRI		
	1 st installment	7lakh (part)	31.12.2018
		Amount	Date
IISc			
1 st installment	7lakh (part)		31.12.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI advised to prepare roadmap to link geophysics, geology and geochemistry of mineral deposit. 2. Next instalment to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	Met4-14/28/2018		
Project Title	Development of grapheme based membranes from graphite ore for desalination		
Institution	CSIR- National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram and CSIR-NML, Madras, Chennai		
Principal Investigator	Dr.(Mrs.) Sreeja Kumari S.S., E-mail:-sreejakumar@niist.res.in, sreejakumariss@gmail.com Mrs. N. Vasumathi E-mail:-tvvk65@yahoo.com		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 60 Lakh 2 Years		
Funds Released	NIIST	Amount	Date
	1 st installment	22.88 lakh (part)	31.12.2018
	NML	Amount	Date
	1 st installment	3.85 lakh (part)	31.12.2018

REMARKS/SUGGESTION :

1. Lot of graphite powder available from used graphite crucibles. Project should be versatile to switch the source of input.
2. Project is bio friendly, scalable and able to find multiple applications.
3. Report average thickness of graphene oxide membrane.
4. Explore use of titania for desalination studies and dye removal applications.
5. Clearly define bulk generation in terms of numbers/figures
6. Functionalize porous graphene membrane with metallic ion.
7. Next tranche of funds may be released subject to submission of utilisation certificate and statement of expenditure

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F. No.	Met4-14/31/2018		
Project Title	Recovery of scandium metal from acid leach liquor from titanium mineral industries		
Institution	CSIR-National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram-695019		
Principal Investigator	Dr. M. Sundararajan, E-mail:-rajanmsundar77@yahoo.com		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 32.92 lakh 2 Years		
Funds Released		Amount	Date
	1 st installment	8.73 lakh (part)	31.12.2018

REMARKS/SUGGESTION :

1. ICP MS data of leach liquor is incorrect (shows presence of valuable elements viz. V, Ni, Zn in higher concentrations)
2. Mass balance of scandium and ICP results are incorrect.
3. PI was advised to send leach liquor samples to at least two independent laboratories for composition analysis and report the finding within a month.
4. Carry out solvent extraction in more number of stages.
5. PI was advised to establish analytical protocol before moving ahead in the project.
6. Consideration of continuation of the project and release of further funds will be considered only after presentation of above reports to next PERC.

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F. No.	Met4-14/26/2018		
Project Title	Improving fracture resistance of rocks through adhesive bonding for underground mining application		
Institution	IIT, Dhanbad (Indian School of Mines), Jharkhand		
Principal Investigator	Dr. Rashmi Ranjan Das, E-mail:-drrrdas@iitism.ac.in		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 14.73467 lakh 15 months		
Funds Released		Amount	Date
	1 st installment	13.9571 lakh (part)	31.12.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PERC advised the PI to select typical crack size in mining rocks and replicating the objectives of project. 2. Rheological properties to be studied. 3. Characterization of cracks of rocks to be studied. 4. PI was advised to visit mining site. 5. Based on the request of PI, PERC recommended a time extension of 3 months. 			

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F. No.	14/34/2014-Met.IV		
Project Title	Novel synthesis routes for high purity kesterites (CZTS:Cu-Zm-Sn-S;Cu-Zn-Sn-Se) and development of cost kesiterite based solar PV cells and modules		
Institution	Non Ferrous Materials Technology Development Centre, Hyderabad		
Principal Investigator	Dr. S. Harinipriya Seshadri, E-mail:-harinipriya@nftdc.res.in		
SSAG Approval	45 th SSAG dated 04.12.2014		
Project Cost & Duration	Rs. 81.30 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	42.712 lakh	21.5.2015
	2 nd installment	21.704 lakh	29.7.2016
	3 rd installment	15.1956 lakh	21.9.2017
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI advised to submit one page write up to the Ministry. 2. PI has submitted the final report. 3. Final report of the project is recommended for acceptance and closure of the project. 4. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	14/54/2014-Met.IV		
Project Title	Production of geopolymer based construction material from pond ASH: an industrial waste		
Institution	Gandhi Institute of Engineering and Technology, Gunupur, Odisha		
Principal Investigator	Dr. Muktikanta Panigrahi E-mail:-muktikanta2@gmail.com		
SSAG Approval	45 th SSAG dated 04.12.2014		
Project Cost & Duration	Rs. 28.955 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	13.805 lakh	29.12.2014
	2 nd installment	9.30 lakh	17.3.2016

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	3 rd installment	5.265 lakh	28.9.2017
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI submitted the final report. 2. Final report of the project is recommended for acceptance and closure of the project. 			

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F. No.	14/74/2015-Met.IV		
Project Title	Recyclability strategy or value-added utilization of iron/manganese ore tailing/ low grade ore: evaluation of energy storage capacities		
Institution	Institute of Minerals and Materials Technology, Bhubaneswar		
Principal Investigator	Dr. Mamata Mahapatra, E-mail:-mamatomahapatara76@gmail.com		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 35 lakh 3years		
Funds Released		Amount	Date
	1 st installment	25 lakh	29.12.2015
	2 nd installment	5 lakh	19.3.2019
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI was advised to submit one page write-up summarizing lab scale studies and roadmap to scale-up with appropriate industry where the product can be used. 2. PI submitted the final report. 3. Final report of the project is recommended for acceptance and closure of the project. 4. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	14/74/2016-Met.IV		
Project Title	Technology Development (TRL-7) for calico-thermic reduction of rare earth metal oxides and establishment of pilot plant for extraction and purification of samarium		
Institution	Non Ferrous Material Technology Development Centre (NFTDC), Hyderabad		
Principal Investigator	Dr. Hareesha Idya, E-mail:-hareesha@nftdc.res.in		
SSAG Approval	47 th SSAG dated 23.08.2016		
Project Cost & Duration	186.50 lakh 2years		
Funds Released		Amount	Date
	1 st installment	107 lakh	19.10.2016
	2 nd installment	71.55 lakh	14.6.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. The project is in its closure state. Final project report to be submitted. 2. PERC advised PI to carry out techno-economic study of process. The study should include the write up of "Why adopted technique is better than conventional process" 3. Balance funds to be released subject to submission of utilization certificate and statement of expenditure. 			

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F. No.	14/75/2016-Met.IV		
Project Title	Extraction of potash values from silicate rocks		
Institution	Indian Institute of Technology, Roorkee, Uttarakhand		
Principal Investigator	Dr.Nikhil Dhawan, E-mail:- ndhawan.fmt@iitr.ac.in		

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	dhawan.nikhil@gmail.com		
SSAG Approval	47 th SSAG dated 23.08.2016		
Project Cost & Duration	Rs. 20 lakh 2years		
Funds Released		Amount	Date
	1 st installment	17.35 lakh	19.10.2016
	2 nd installment	1.15 lakh (part)	4.12.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI has submitted the final report. 2. Final report of the project is recommended for acceptance and closure of the project. 3. PI advised to submit two-page write-up to Ministry including flow sheet of overall process with mass balances, papers published summarizing the project. 4. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	14/77/2015-Met.IV		
Project Title	Mineralogical and geochemical characterization of Indian glauconites for alternative potassium fertilizers		
Institution	Indian Institute of Technology, Bombay and NGRI, Hyderabad (jointly)		
Principal Investigator	Shri Santanu Banerjee, Email:- santanu@iitb.ac.in Dr. P. V. Sunder Raju, E-mail:-perumala.raju@gmail.com		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 55 lakh 3 Years		
Funds Released	IIT Bombay	Amount	Date
	1 st installment	12.5 lakh	29.2.2016
	2 nd installment	7.5 lakh	29.9.2017
	3 rd installment	6.75 lakh(part)	28.12.2018
	NGRI	Amount	Date
	1 st installment	12.5lakh	29.2.2016
	2 nd installment	7.5 lakh	29.9.2017
3 rd installment	6.75 lakh(part)	28.12.2018	
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. PI submitted the final report. 2. However, PI was advised to submit a summary, map showing Glauconite deposits with resources available in India and a Flow-sheet of the process. 3. Final report of the project is recommended for acceptance and closure of the project. 4. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	14/39/2015-Met.IV		
Project Title	Assessment and prediction of land surface deformation due to underground metal mining in northern aravali range of hills using microwave remote sensing data sets and ground based Observations		
Institution	IIT, Dhanbad(Indian School of Mines), Jharkhand		
Principal Investigator	Shri Dheeraj Kumar, Email:- dheeraj@dkumar.org		

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	dt@ismdhanbad.ac.in		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 45 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	25.6 lakh	29.12.2015
	2 nd installment	9.7 lakh	21.9.2017
	3 rd installment	8.73 lakh	28.1.2019
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. All Objectives not fulfilled properly. PERC recommended for closure of project. 2. Un-utilised amount to be returned along with upto date UC. 3. PI advised to submit the Final Report by 15th February 2020. 			

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F. No.	14/22/2014-Met.IV		
Project Title	Development of low density emulsion explosives for energy efficient blasting in environmentally sensitive areas		
Institution	IIT, Dhanbad(Indian School of Mines), Jharkhand		
Principal Investigator	Dr. Arvind Kumar Mishra, Email:- dravndmishra@gmail.com		
SSAG Approval	45 th SSAG dated 04.12.2014		
Project Cost & Duration	Rs. 29.134 lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	18.95 lakh	16.12.2014
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. One page write-up to be submitted to Ministry. 2. PI advised to explore the option of filing patent. 3. PI has submitted the final report. 4. Final report of the project is recommended for acceptance and closure of the project. 5. Balance funds to be released subject to submission of utilization certificate and statement of expenditure 			

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F. No.	14/41/2015-Met.IV		
Project Title	Study the feasibility of treatment of seepage water from chromite mine quarries of Odisha		
Institution	National Institute of Technology, Rourkela		
Principal Investigator	Dr. (Mrs) Susmita Mishra, Email:- smishra@nitrrkl.ac.in Smishra1234@gmail.com		
SSAG Approval	46 th SSAG dated 02.12.2015		
Project Cost & Duration	Rs. 32 Lakh 3 Years		
Funds Released		Amount	Date
	1 st installment	16lakh	29.1.2016
	2 nd installment	8 lakh	21.9.2017
	3 rd installment	7.2 lakh	19.12.2018
REMARKS/SUGGESTION : PI WAS ABSENT.			

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F. No.	Met.4-14/6/2018		
Project Title	Development of a Low-cost Portable Optical Reflectance Spectrometer for Mining and Mineralogy		
Institution	Indian Institute of Technology, Madras		
Principal Investigator	Dr. Sivarama Krishnan, E-mail:-srikrishnan@iitm.ac.in		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 10.0 lakh 1 Year		
Funds Released		Amount	Date
	1 st installment	6.1 lakh (part)	28.9.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. Lacks applicability to minerals to have proof of concept 2. PI was advised to validate /proof of concept of the device with a few real minerals. 3. PI advised to submit the final report. 4. PERC recommends closure of the project with submission of utilization certificate and release of any residual dues within the sanction project cost. 			

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F. No.	Met.4-14/7/2018		
Project Title	Novel Approach to Recover Individual Valuable Heavy Minerals from Pyriboleferrous Beach and Dune Sand Deposits		
Institution	CSIR-Institute of Minerals & Materials Technology, Bhubaneswar		
Principal Investigator	Dr. C Eswariah, E-mail:-eswar@immt.res.in		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 15.0 lakh 1 Year		
Funds Released		Amount	Date
	1 st installment	6.775 lakh (part)	28.9.2018
REMARKS/SUGGESTION :			
<ol style="list-style-type: none"> 1. Screen separation is better replacement of air separator. 2. Project objective is achieved 3. PI advised to submit the final report. 4. PERC recommended for extension of the project duration till 31st March, 2020. 5. Balance funds / residual dues within the sanctioned project budget may be released subject to submission of utilisation certificate and statement of expenditure. 			

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F. No.	Met.4-14/29/2018		
Project Title	Development of capacitive deionization technology for the extraction of germanium and selenium: Two elements of strategic relevance		
Institution	IIT, Madras, Chennai		
Principal Investigator	Professor T.Pradeep E-mail:-pradeep@iitm.ac.in		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 29.61 lakh 1 Year		
Funds Released		Amount	Date
	1 st installment	13.10 lakh (part)	31.12.2018
REMARKS/SUGGESTION :			

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1. Establishing CDI at a place and use it for selective extraction of precious elements from mine water
2. Phase I is successful in looking at real industrial mine water and found that germanium (Ge) and selenium (Se) were very low for extraction and strontium (Sr) levels are attractive.
3. Aqueous solutions from JNARDDC (red mud RE leachate project) and leachate from copper tailings (HCL) will be provided.
4. Phase-I of the project is recommended for extension by one year as the work is very relevant and useful for extraction of valuables from waste solutions.
5. Balance funds may be released subject to submission of utilisation certificate and statement of expenditure.

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F. No.	Met.4-14/30/2018		
Project Title	Treatment of Acid Mine Drainage for Heavy Metal Removal		
Institution	IIT, Mandi, Kamand Campus, VPO Kamand		
Principal Investigator	Dr. Sumit Sinha Ray, E-mail:-sumitsinha@iitmandi.ac.in		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 19.8397 lakh 1 Year		
Funds Released		Amount	Date
	1 st installment	16.02 lakh (part)	31.12.2018

REMARKS/SUGGESTION :

1. So far only copper is tested using synthetic solution and to be extended for other metals (Co, Ni, etc.).
2. Samples from HCL will be provided for testing real time industrial solutions with higher concentrations in large volumes
3. Tuning for particular ions at different concentrations is required
4. Biological membrane worked for one metal (Cu)
5. Summarize the manufacture and scalability of bio polymer membranes.
6. Higher concentrations, multi-metal and flow.
7. Cost effective and scalable biopolymer membrane proved to work for copper metal in synthetic solution.
8. Test industrial solutions and test for other elements in higher concentrations
9. Extension of project (6 months) is recommended by PERC without cost escalation.
10. One page summary consisting objective and future plan is to be submitted.
11. Next tranche of funds may be released subject to submission of utilisation certificate and statement of expenditure.

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F. No.	Met4-14/24/2018		
Project Title	Bench scale study on extraction of pure Silica and smelter grade Aluminium Fluoride from Coal Fly Ash (CFA)		
Institution	JNARDDC, Nagpur		
Principal Investigator	Shri Manoj T. Nimje E-mail:- mantukni@gmail.com		
SSAG Approval	50 th SSAG dated 02.11.2018		
Project Cost & Duration	Rs. 63.026 lakh 1½ Year		
Funds Released		Amount	Date
	1 st installment	38.205 lakh (part)	27.03.2019

REMARKS/SUGGESTION :

1. PI was advised to carryout tentative cost estimation (OPEX & CAPEX) of pure silica and

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aluminium fluoride produced through the project (cost comparison w.r.t market price).

2. Refer other methods for finding free silica content in CFA.
3. Titanium slag (2% Ti) is valuable.
4. Teflon coated glassware should be used for scalability.
5. Evacuate HF quickly to avoid backward reaction. Implement ways to remove HF quickly. Use closed loop circuit design and introduce make-up feed for HF.
6. Use silica as a nucleation agent for depositing silica during vapour deposition. Also try meshes or glass filters.
7. Use silica beds in series, process and reactor engineering is to be implemented for preventing backward reaction forming H_2SiF_6 (step 2).
8. Product should end with reactor design for bench scale production (1kg) and should be techno-economically feasible.
9. Next tranche of funds may be released subject to submission of utilisation certificate and statement of expenditure

Agenda No 2

F. No.	Met4-14/19/2018		
Project Title	Techno-economic survey of Al-scrap recycling in India		
Institution	JNARDDC, Nagpur		
Principal Investigator	Shri R N Chouhan E-mail- rnchouhan@gmail.com		
SSAG Approval	49 th SSAG dated 31.07.2018		
Project Cost & Duration	Rs. 53.55 lakhs 1 Year		
Funds Released		Amount	Date
	1 st installment	20.50 lakh (part)	27.09.2018

REMARKS/SUGGESTION :

1. PI was asked to pool the data of existing organized and report all the raw data collected so far.
2. Collect licensed recyclers data from pollution control boards, Director of industries and other official sources. Visit and collect data from licensed recyclers first.
3. PI was advised to include an activity plan during extension period.
4. PERC recommended for extension of the project by one year without any cost escalation.
5. Balance funds may be released subject to submission of utilisation certificate and statement of expenditure

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LIST OF PARTICIPANTS OF REVIEW MEETING OF PERC HELD AT JNARDDC, NAGPUR ON 21-22 JANUARY 2020

Sr no	Name	Portfolio
1.	Shri Satendra Singh Joint Secretary (Mines), Delhi	Chairman
2.	Shri H. K. Mallick Deputy Secretary (Mines)	Member
3.	Dr. K. Balasubramanian Director, NFTDC Hyderabad	Member
4.	Prof. T.C. Rao Ex. Director, RRL Bhopal	Member
5.	Prof. S.P. Mehrotra IIT, Gandhinagar	Member
6.	Shri Arun Kumar Shukla CMD, HCL, Kolkata	Member
7.	Dr. A. Agnihotri Director, JNARDDC, Nagpur	Member
8.	Dr. H. S. Venkatesh Director, NIRM, Bangalore	Member
9.	Shri S. K. Roy Director (P&T), NALCO, Bhubaneswar	Representative Member
10.	Dr Bibhuranjan Nayak, Sr. Principal Scientist, CSIR-IMMT	Representative Member
11.	Dr. S. Kamalakaram DGM (Exploration) , MECL, Nagpur	Representative Member
12.	Dr. C. N. Ghosh Chief Scientist & Head, CIMFR, Dhanbad	Representative Member
13.	Dr. Shravan Kumar Dep of Fuel & Mineral Engg. IIT (ISM), Dhanbad	Representative Member
14.	Dr B. B. Mondal Asst. Professor, IIT, Kharagpur	Representative Member

Leave of absence granted to other members.