Minutes of 14th PERC Meeting held on 16-17 October 2015 at NFTDC, Hyderabad

PREAMBLE :

The preliminary meeting of the 14th Project Evaluation and Review Committee (PERC) was held on 14th September 2015, under the Chairmanship of Dr Sudhakar Shukla, Economic Advisor, Ministry of Mines. In the preliminary meeting, the committee divided the project thrust areas in to the following five major categories and sub categories viz

1.   **Exploration related** such as in Exploration & Prospecting, Evaluation of Samples; Assessments, database for minerals;

2.   Mining Related

2.1   Mine Planning + Rock Mechanics + Mining methods + Mining Equipments Engineering; energy efficient Mining\

2.2   Mine Safety, Sensors etc

2.3   Mine waste/ water / soil contamination and reclamation

2.4   Miners Health Related Projects; Noise, vibration, airborne dust, chemicals etc

3.   Beneficiation, Ore Dressing & Mineral Processing

3.1   Beneficiation & Mineral Processing;

3.2   Recovery of metal / values from low grade ores, tailings, mine waste

3.3   Value Addition to Minerals & Mineral based product developments; Utilization of wastes, fly ash, red mud and product development

4.   Metal Extraction

     Metal Extraction, Process Metallurgy, Separation Methods

5.   High Purity Materials, Speciality Materials REs etc
     Alloys, Product Developments, High Purity Metals, Minerals, compounds; Speciality Materials; Rare Earths, solar materials

Eighty Six Project Proposals have been received from 38 institutions The project proposals have been accorded a unique ID and the list is given in Appendix I. The Project Proposals are compiled below in Table I illustrating the institution - wise distribution. It is seen from the data, that distribution of institutions show a range of organizations which illustrates a good exposure of S & T scheme of SSAG in academia, laboratory and industry. It can be observed that that (a) eight laboratories, (b) ten academic institutions including ISM, IITs, NITs, IISET (c) nine universities comprising of both private and government, (d) twelve colleges and (e) one government department thus totalling 38 institutions have submitted 86 project proposals.

(a) The two autonomous labs, namely JNARDDC and NIMH under the aegis of Ministry of Mines and six CSIR labs have 6 and 8 proposals to their credit
(b)While, ISM, Dhanbad has submitted 8 proposals, six IITs together have put in 13 proposals and NITs + IISET are responsible for 8 proposals.
(c) Nine Universities have come up with 20 proposals;
(d) 12 colleges have participated in this call with 22 project proposals.
(e) A lone proposal has also come from the Government Department of Arunachal Prades

TABLE I : Institution wise Distribution of Project Proposals

Institution	Total	Proposal ID No	Remarks
		LABS (2 MoM Institutions)	
JNARDDC, Nagpur	4	31, 32, 33, 34,	Jointly with 4 partners
NIMH, Nagpur	2	24, 48	One - Jointly with hospital
		LABS (6 Instn from CSIR)	
IMMT,(CSIR)	1	75,	
AMPRI (CSIR)	2	49, 52	
NIIST (CSIR)	2	11, 65	One project jointly NAL
CMERI (CSIR)	1	78	
NGRI, (CSIR)	1	26	
Central Salt & Mar. Chem. Guj. (CSIR)	1	4	
			14 Proposals from 8 LABs
		ISM (one Institute)	
Indian School of Mines, Dhanbad	8	1, 10, 14, 16, 22, 25, 28, 38	**8 Proposals from ISM**
		IITs (6 Institutions)	
IIT Roorkee	5	2, 6, 13, 71, 83	
IIT Kanpur	2	8, 15	
IIT Guwahati	2	3, 17	
IIT KGP	1	58	
IIT Bombay	2	44, 73	One jointly with NGRI
IIT Madras	1	84	**13 Proposals from 6 IITs**
		NITs + IIEST = (3 Instns)	
NIT Rourkela	5	35, 40, 41, 42, 76,	
VNIT, Nagpur	1	74	
IIEST, Shibur WB	2	46, 61	**8 Proposals (NITs+IIEST)**
		UNIVERSITIES (9 Instns)	
Amity University	8	9, 29, 30, 43, 45, 47, 59, 85	
Anna Univ, Chennai	2	54, 56	
AMU, Aligarh	1	5	
BITS Pilani	2	18, 21	
Central Univ, Sch Earth Sci. Karnataka	1	60	
Periyar Univ, Salem	1	57	
RTMNU, Nagpur	2	36, 86	
Utkal Univ, Bhubaneswar	1	81,	
VIT Vellore	2	77, 82	**20 Proposals from UNIVs**
		COLLEGES (12 Instns)	
Jeppiaar Inst of Technology Chennai	5	66, 67, 68, 69, 79	
Gandhi Inst Engg & Tech, G'pur, Odisha	**2**	27, 39	
Gandhi Inst. Tech Advancement, Odisha	**6**	19, 51, 55, 62, 63, 64	
Siksha Anusandan Univ, Bhubaneswar	1	7	
Konark Inst S & T, Bhubaneswar	1	53	
CV Raman College. Engg, Bhubaneswar	1	12	
JNTU, Univ College of Engg. Kakinada	1	70	
RVS College, Jamshedpur	1	50	
Haldia Inst of Tech WB	1	72	
Indian Inst. Soc Wel & Mgmt, kolkatta	1	23	
SDM College of Engg & Tech, Dharwad	1	80	
Kristu Jayanti College, B'lore	1	37	**22 Proposals - Colleges**
		GOVT Dept (One dept)	
Govt of Arunachal (dept of geology)	1	20	**1 proposal - Govt dept**
TOTAL No of Projects	86	From Labs=14; Academia =72	**14+(8+13+8+20+22+1)=86**
Total No of Institutions	38		

AGENDA IETM 1 : Review of New Proposals

The following three stage review process was considered.

(i)   Preliminary Evaluation to separate project proposals that do not fall under the thrust areas as per the extant guidelines given in the call for proposals;

(ii)   Detailed review by groups of experts as per the categorization and short listing for next stage for presentation and review;

(iii)   Presentation and review of short listed proposals and final recommendation.

Preliminary evaluation was done on 14 Sept 2015 by PERC and twenty project proposals, given below in Table II out of 86 were found to be not falling under the thrust areas given in the call for proposals and guidelines. These proposals relate specifically to coal, iron and steel related projects and there are S & T programmes dedicated for these categories under Ministry of Coal and Ministry of Steel. Likewise, basic research is funded by DST and DBT while ARDB and BRNS fund proposals specific to aeronautical and nuclear sciences. The PIs can be advised to submit their proposals to these agencies.

Table II Projects that do not fall in the thrust areas: (20 Proposals)

S No	Category (Non Thrust)	Project Nos
1	Coal	2, 6,17, 37, 82, 84,
2	Iron & Steel	43, 50, 81,
3	Proposals that should go to other S & T schemes	49, 53, 65, 83, 49, 53, 85> fundamental basic work>>DST; 65> aero related; DST or ARDB (aeronautical R & D Board is appropriate)
4	Other (unrelated)	8, 23, 36, 51, **58, 59, 69**

The remaining 66 projects have been regrouped as per categorization as given above. Soft copies of the project proposal were sent to expert groups drawn from PERC. The expert members were drawn from PERC members from various institutions. The experts were chosen so as to match the five categories to review and recommend short listed proposals for next stage of full presentation. At least two review members were considered for each category of proposals as given in TABLE III below.

TABLE III : Project Proposals (66) for second stage review

	Category	Project No	Remarks
	Exploration Related		
1	Exploration & Prospecting, Evaluation of Samples; Assessments, database for minerals (bauxite etc)	**5, 11,13,20, 26, 32, 44, 46, 56, 57, 60, 73, 77, 80,**	**14 Projects** GSI and MECL experts to do Review
	Mining Related		
2.1	Mine Planning + Rock Mechanics + Mining methods + Mining Equipments Engineering; energy efficient Mining	**10, 14, 18, 21, 22, 25, 27, 29, 35, 38,** **61, 74, 78**	**13 Projects** IITKGP and MECL expert members to review ISM and other proposals;

			ISM and IIT KGP and MECL members to review non-ISM proposals.
2.2	Mine Safety, Sensors etc	**1, 9, 30, 63, 66, 67, 68**	**7 Projects** NIRM, IITKGP, ISM to review
2.3	Mine waste/ water / soil contamination and reclamation	4, 15,19, 40, 85, 86	**6 Projects** NIRM, and Prof SP Mehrotra to review
2.4	Miners Health Related Projects; Noise, vibration, airborne dust, chemicals etc	**16**, 24, 48	**3 Projects** Project 16 Short listed by PERC
	Beneficiation, Mineral Processing etc		
3.1	Beneficiation & Mineral Processing;	3, 39, 47, 71	**4 Projects** Profs SP Mehrotra, Prof TC Rao and NALCO member to review
3.2	Recovery of metal / values from low grade ores, tailings, mine waste	7, 28, 33, 34, 42, 45, 72	**7 Projects** Profs SP Mehrotra, Prof TC Rao and NALCO member to review
3.2	Value Addition to Minerals & Mineral based product developments; Utilization of wastes, fly ash, red mud and product development	41, 55, 62, 64, 70, 75, 76	**7 Projects** Profs SP Mehrotra, Prof TC Rao and NALCO member to review
	Metal Extraction		
4	Metal Extraction, Process Metallurgy, Separation Methods	12	**1 Project** Prof SP Mehrotra and Director, NFTDC to review
	High Purity Materials, Speciality Materials REs etc		
5	Alloys, Product Developments, High Purity Metals, Minerals, compounds; Speciality Materials; Rare Earths, solar materials	31, 52, 54, 79	**4 Projects** Prof SP Mehrotra and Director, NFTDC to review

Based on the review by the experts, 35 proposals were short listed from 66 for presentation and final review which is given in Appendix II. The final PERC meeting was held on 16th and 17th October at NFTDC, Hyderabad. The PIs were given guidelines on how to prepare the presentation for 15 minutes each and were taken up for review as per categories of specialization listed above.

The Proposals were evaluated with the following criteria

(i) Objectives of the study and relevance to the thrust area; Has it already been done before or has been funded by SSAG or other S &T schemes; Does it address the gap areas in India, particularly in terms of applied research leading to development
(ii) Problem Definition >> Is the Problem well defined in terms of specifics or not;
(iii) Research Methodology >> Is the proposed Methodology doable and is it likely to give a solution path to the defined problem; Is the PI or research team and the institution competent to do the research;
(iv) Deliverables >> Will there be tangible deliverables potential for translation to user agency;

(v) Is there any co-funding with industrial partners or any other institutional co-funding which will demonstrate higher level of ownership and translation potential.

Recommendations

Category 1 : Exploration & Prospecting, Assessments, Evaluation of Samples, Database etc

The following <u>four short listed projects</u> were reviewed in detail.   The titles, PI, Institution are the recommendations are given hereunder.

S No	Project ID	Project Title	PI & Institution	Recommendation
1	**26**	Petro-mineralogical and geochemical studies on the REE bearing carbonatite and other associated alkaline rock complexes of Parts of Shillong Plateau, NE India	Dr. P.V. Sunder Raju Principal Scientist, NGRI Hyderabad	Application of project objectives and outcome to REE is not clear; PI may resubmit after detailed revision including subsurface modelling of host rocks and relate it to estimation of REEs NOT RECOMMENDED
2	**57**	Prospecting, Estimating, And Locating Rare Earth Element (REE) Minerals Present In Carbonatite Complexes Of Pakkanadu And Hogenakkal Areas Of Dharmapuri Suture Rift Zone (Dsrz), Tamil Nadu: A Geochemical And Petrological Approach	Dr.K.ANBARASU Assistant Professor, Department of Geology, Periyar University, Periyar Palkalai Nagar, Salem – 636 011, TN	Project Methodology is not clear; Physical targets are not spelled out. NOT RECOMMENDED
3	**73**	Mineralogical and geochemical characterization of Indian glauconites for alternative potassium fertilizers	Dr. Santanu Banerjee, Professor Dept of Earth Sciences IIT Bombay Powai, Mumbai-400076	Problem definition and deliverables are well defined and have direct application to fertilizer industry. PI should interact with fertilizer industry to firm up specific requirements of Glauconite utilization; RECOMMENDED with reduced budget of Rs 55 Lakhs
4	**80**	Rare Earth Mineral Concentration in the beach sands of Uttara Kannada Coast : Their economic viabilities and sustainable mining.	Dr. VS Hegde, Professor, SDM College of Engineering and Technology	Project objectives are very relevant as monozite deficient beach sands are potential source of REEs. Methodology and deliverables are well laid out. RECOMMENDED.

M**ajor Category 2 : Mining**
Category 2.1 :   Mine Planning + Rock Mechanics + Mining methods + Mining Equipments Engineering; energy efficient Mining
The following <u>eleven projects</u> were reviewed and the recommendations are given hereunder:

S No	ID	Project Title	PI & Institution	Recommendation
5	**10**	Investigations into the feasibility of complete extraction of uranium ore form the underground workings of UCIL mines and devise a suitable method of working	Dr. Hemant Kumar Assistant Professor Dept of Mining Engg, ISM, Dhanbad	The Project has to be executed jointly with UCIL of Dept of Atomic Energy; Research methodology needs to be firmed up better;

				Potential gains to UCIL to be illustrated with clarity; PI may resubmit as a joint project with UCIL and possible co-funding with DAE/BRNS NOT RECOMMENDED;
6	**14.**	Development of Environment Friendly Blasting Techniques	Dr. Bhanwar Singh Choudhary; Asst. Professor Dept of Mining Engg, ISM, Dhanbad	The project as proposed is of exploratory nature; Specific outcome to be well defined; An industrial partner required for any fruitful application. May resubmit with detailed revision and co-funding and partnership with industry NOT RECOMMENDED
7	**21.**	Simulation of simultaneous rock fractures at multiple scale.	Gaurav Singh, Assistant Professor, BITS, Pilani - Goa	Project is simulation and modelling based work and aims at obtaining efficient rock blasting; PI is competent and methodology adopted is doable. PI is just starting his career and he should interact with industry . RECOMMENDED With reduced budget; Only one PhD (HR item) and Inst-(O/H) as per given norms recommended.
8	**25.**	Study and development of Series-Parallel hydraulic hybrid energy efficient excavator	Dr. Jayanta Das Assistant Professor Dept. of Mining Machinery Engineering, ISM, Dhanbad	Project deals with mining machinery development; Problem definition is very specific and methodology doable. Hand-holding with Equipment manufacturer is mandatory; NOT RECOMMENDED
9	**27.**	Investigation of energy conservation potential in mining industry through energy efficiency approaches with integration of onsite renewable energy sources.	Prof. GRKD. Satya Prasad Prof. & HOD- Dept. of EE, Gandhi Inst of Engg & Tech, Gunupur, Odisha	Project is more of consultancy type in energy audit and intervention. NOT RECOMMENDED
10	**29.**	Develop a CFD solver of slurry flow for designing of hydraulic conveying system of ore transportation.	Dr. Basant Singh Sikarwar Associate Professor, Amity School of Engg & Tech, Amity University, Noida Dr. D. R. Kaushal, Associate Professor, Deptt. of Civil Engineering, IIT Delhi	Project Proposal primarily deals with numerical CFD solver development with lab scale model for visualization and model validation; It is more of a basic research. NOT RECOMMENDED
11	**35.**	Development Of An Unpaved Opencast Mine Haul Road Maintenance Management Systems In Indian Context	Dr. Prasanta Kumar Bhuyan Assistant Professor Dept of Civil Engg, NIT Rourkela	Project is more of a consultancy type for mine road planning and vehicle trip optimization. NOT RECOMMENDED
12	**38.**	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	Dr. Dheeraj Kumar Associate Prof. & I/C, Mine Surveying Section, Dept of Mining Engg, ISM, Dhanbad.	Project is doable and the PI and institution are well qualified to execute the project. RECOMMENDED with reduced budget outlay.

S No	ID	Project Title	PI & Institution	Recommendation
				Remove LIDAR (software expenditure); Institution O/H as per SSAG norms.
13	**61.**	Monitoring compliance of approved mining plan in an iron ore mechanized opencast mine using a Wi/Fi with integrated GPS based RFID solution is forwarded herewith	Prof. Suranjan Sinha Professor Dept of Mining Engg, IIEST Shibpur. WB	GPS with WiFi and RFID based solutions are to be taken up directly by Mining companies. PIs can execute these kind of projects in consultancy mode. NOT RECOMMENDED
14	**74.**	Behavior of Underground Opening under different ground conditions.	Dr. Anirban Mandal, Associate Professor, Civil Engg Department, VNIT Nagpur	The project is more of lab scale simulation; Project needs application vector and industrial partner. PI may consider an industrial partner an firm up direct application and resubmit in the future NOT RECOMMENDED
15	**78**	De-centralized multi-robot Application for Surveillance , Environment monitoring and Operational Safety of (Open cast) mines and adjoining areas.	S Majumder Chief Scientist, CMERI	Project outlay is very large and the problem defined is very generic. NOT RECOMMENDED

Major Category 2 : Mining
Category 2.2 : Mine Safety, Sensors etc
Category 2.3 : Mine waste/ water / soil contamination and reclamation
Category 2.4 : Miners Health Related Projects; Noise, vibration, airborne dust, chemicals etc

The following eleven projects in the above three sub categories were evaluated and recommendations are given hereunder.

S No	ID	Project Title	PI & Institution	Recommendation
		Category 2.2		
16	**1.**	Development of Fiber Bragg Grating (FBG) Based Chemical Sensor for monitoring of Hazardous Toxic Chemicals and Gases in an Underground Mines	Dr. Sanjeev Kumar Raghuwanshi, Assistant Professor, Dept of Electronics Engg, ISM, Dhanbad	Similar project already done. Proposal is now at hypothesis level and needs preliminary work for proof of concept. NOT RECOMMENDED
17	**30.**	Towards greener and safer mines with wireless sensor networks.	Dr. Priya Ranjan, Professor, Dept. of EEE., Amity School of Engg & Tech, Amity Univ, Noida	Project has prima facie relevance; However it is deficient in methodology and application. NOT RECOMMENDED at this stage. Project may be resubmitted with a good industry partner and demonstration of field deployment as clear objective.
18	**63.**	Development of Smart Helmet : An Innovative Device for safety in Mines.	Monalisa Samal, Assistant Professor, Dept. of Electronics & Comm Engg, GIFT, Bhubaneshwar, Odisha	Problem definition and methodology are not properly done and they are very sketchy. NOT RECOMMENDED
19	**66.**	Low cost Tripper Assisted belt conveyor tension regulation using renewable power supply.	Dr. C. Rajesh Kumar Associate Professor, Jeppiaar Inst. Tech Chennai	Problem definition has not been done and the solution given is more of a small demonstration project for students. Innovation is limited. Solution should be done with NLC (Neyveli) and

				should have potential for quick translation. NOT RECOMMENDED
20	67.	Environmental Protection for Toxic Gas Detection and Landslide for Mine Safety	Sh. ARUL S Associate Professor, Jeppiaar Inst. Tech Chennai	Project definition and proposed methodology are sketchy. NOT RECOMMENDED
		Category 2.3		
21	4	Ligand assisted / surfactant enhanced filtration for metal ion removal from water through tailor made membranes	Dr. Amit Bhattacharya Scientist, Central Salt & Marine Chemicals Research Institute, Bhavnagar	Generic Problem definition is done well and the research methodology is doable and PI is very competent. However, the project ends as an academic exercise. PI should define the specific application area and take up partner institution to complement and resubmit to next PERC. NOT RECOMMENDED at this stage.
22	19.	A Novel Technique To Estimate The Concentration Of Fluoride In Mines Water	Dr. Gopinath Palai, Professor & Head, Dept.of ECE., Gandhi Inst for Tech. Adv (GITA), Bhubaneswar	Existing techniques are well established and efficient. The new technique proposed is complicated with no distinct advantage. NOT RECOMMENDED
23	40.	Study the feasibility of treatment of seepage water from chromite mine quarries of Odisha	Dr. (Mrs.) Susmita Mishra Associate Professor Dept of Chemical Engg, NIT, Rourkela	Problem definition and research methodology well done; PI has done good preliminary work; RECOMMENDED with budget outlay of Rs 32 Lakhs.
24	85.	Bioremediation of toxic chromium contamination at mining sites using Antarctic algal isolates	Prof. Tanu Jindal Director and Professor , Amity Inst of Environmental Toxicology, Safety and Mgmt, J-1 Block, Noida	Project Proposal is not directly relevant to the thrust areas; Preliminary work relevant to mining not done; Algal, basic material is to be sourced from Antartica. NOT RECOMMENDED
25	86.	Uncovering the bacterial consortium from mining soils : A boot step approach in Development of a Novel Carbon Sequestrating strategy	Dr. Sunil Sohanlal Pande Associate Professor, Rajiv Gandhi Biotech Centre, R.T.M. Nagpur University	The project is more on basic research aimed at uncovering bacteria that may occur in mining environment. It is more relevant for submission to DBT. NOT RECOMMENDED
		Category 2.4		
26	24.	Development of standard protocol of field audiometry for notifying noise induced hearing loss	Dr. Sarang Dhatrak Sr. Research Officer (OH), NIMH, Nagpur	Project well defined and relevant; RECOMMENDED with reduced budget of Rs 40 Lakhs

Major Category 3 : Mineral Processing
Category 3.1 : Beneficiation & Mineral Processing;
Category 3.2 : Recovery of metal / values from low grade ores, tailings, mine waste
Category 3.3 : Value Addition to Minerals & Mineral based products; Utilization of wastes etc

Major category 4 : Metal Extraction
Category 4   : Metal Extraction, Process Metallurgy, Separation Methods

Major Category 5 : Specialty Materials
Category 5   : Alloys, Product Developments, High Purity Matls, Speciality Materials

The following nine projects pertaining to the above categories have been evaluated and the recommendations are given hereunder.

S No	ID	Project Title	PI & Institution	Contact Details
		Category 3.1		
27	**71.**	Extraction of potash values from silicate rocks	Dr. Nikhil Dhawan, Assistant professor, IIT Roorkee.	Project to be revised with emphasis on mechano-activation; PI may resubmit in next PERC NOT RECOMMENDED
		Category 3.2		
28	**7.**	Enhanced recovery of Manganese as Electrolytic Manganese Dioxide (EMD) from ferro manganese mine tailings through bioleaching	Dr. Alok Prasad Das, Assistant Professor, Siksha O Anusandhan University, Khandagiri, Bhubaneswar	Problem definition and methodology adopted are okay. RECOMMENDED with reduced budget of Rs 30 Lakhs and EDAX (capital item) to be removed.
29	**28.**	Process Development for Recovery of Tungsten values from Gold Mine Tailings	Dr. Nikkam Suresh, Professor, Department of Fuel & Mineral Engg, ISM, Dhanbad	There is lack of preliminary work and work plan lacks clarity. NOT RECOMMENDED
30	**45.**	Extraction of gold from mine waste using polyorganosulfur compounds	Dr. Neeru, Assistant Professor, Amity University, Manesar, Haryana.	Objectives are not clear; proposal open ended and sketchy NOT RECOMMENDED
		Category 3.3		
31	**34**	Synergistic Utilization of Aluminium Industrial Wastes for Development of Geopolymeric Building Materials	Dr. Mohamed Najar P.A, Scientist IV, JNARDDC, Nagpur	Methodology to be slightly modified to reduce soda and incorporate other alkalies. RECOMMENDED
32	**64.**	Developmental Studies and Industrial trial of fly ash based insulators and dielectrics.	Prof. Sibananda Mishra, Asst professor, Gandhi Inst for Technology, GIFT Bhubaneswar	PI has done preliminary work and has obtained a patent Proposal to be modified for scale - up with application and industrial partner and emphasis on testing (CPRI). Resubmit after incorporating the above NOT RECOMMENDED at this stage
33	**75.**	Recyclability strategy or value-added utilization of iron/manganese ore tailing/ low grade ore: evaluation of energy storage capacities	Dr. Mamata Mohapatra, Scientist IMMT, Bhubaneswar	Project is doable, but application demonstration is a must. RECOMMENDED with reduced outlay of Rs 35 Lakhs and co funding from CSIR or Lab.
		Category 4		

34	**12.**	Reclamation of valuable metals from spent refinery catalyst using hydrometallurgical techniques & preparation of closed loop process flow sheet.	Dr. Debarata Pradhan, Assistant Professor, Department of Chemistry, C.V. Raman College of Engineering, Bhubaneswar	Preliminary work is not done to prove the concepts or exploration of leaching agents; similar projects done elsewhere; NOT RECOMMENDED
		Category 5		
35	**31.**	Developing downstream applications of strip cast aluminium alloys	Dr. Rajesh K. Katirkar Assistant Professor , VNIT, Nagpur. R. N. Chouhan, Scientist III JNARDDC, Nagpur	It is a consortium project with potential use of results by the aluminium industry. RECOMMENDED

AGENDA ITEM 2

Review of On - Going and Completed Projects.

	Title of Project	**Recommendation**
2.1	Development of multilayered materials for melting, liquid handling and casting under high pressure and loads, NFTDC, Hyderabad D. Lokeswara Rao, Co-PI made detailed presentation. Two categories as per original proposal of multi - layer components were made for liquid injection press and centrifugal casting apparatus and functionally tested. A major process equipment (cold iso-static press) has been an important addition thanks to this project. NFTDC shall continue further development of novel multi-layer components beyond this project.	Project Completed and completion report made and submitted for review by PERC. Last Installment can be released. Project Completion report to be reviewed by Director, JNARDDC.
2.2	Up-gradation & Utilization of laterite of east and west coast deposits :(JNARDDC), Nagpur Dr. S P Puttewar, Scientist,	Project Completed and report under submission. Last Installment to be released.
2.3	Evaluation of Biomarkers for early detection of Noise induced hearing loss in the mine workers, NIMH, Nagpur Dr. Shubhangi Pingle, Scientist.	Project Completed and report under submission; PI was asked to re examine some of the conclusions with respect variance and co variance. Last Installment to be released.
2.4	Development of Standard Framework and guidelines for noise mapping in mines and surrounding community, (NIMH), Nagpur	Final Installment to be released.
2.5	Feasibility and Application of Bio-fuel as well as low cost and diluted ANFO for cost effective and safe blasting practices in opencast metalliferrous Mines in India, CIMFR Dhanbad; Co-PI from CIMFR made a detailed presentation. The project is completed.	Final Report submitted to PERC. Report accepted. CIMFR to take steps to disseminate the application of this methodology to the mining sector effectively.
2.6	Characterisation of Indian lean grade magnesite ore and	Not attended by PI or Co-PI. Final report to

	improvement of its high temperature refractory properties with or without beneficiation, CGCRI Dr. Manas Kamal Haldar,	be examined by two experts of PERC. Dr SP Mehrotra and Director NFTDC to examine the final report.
2.7	Recovery of copper from copper smelter dust and novel fixation of arsenic in geopolymer matric derived from concerter slag-scientific and techno- feasibility studies, NFTDC, Hyderabad Dr. B R V Narasimhan, Sr. Sci	This is Phase I of the original project proposed. The innovative process flow sheet developed for fixing Arsenic as well as copper recovery was appreciated by PERC. Dr SP Mehrotra suggested aggressive and accelerated leaching by SO2 and other reagents to study the fixation effectiveness. PI is recommended to take actions for patenting. As large quantities of such copper dust with As is available in Cu smelters, NFTDC should interact with HCl or other Cu companies and take up Phase II jointly with the companies.
2.8	Production of ferro nickel from chromite overburden/nickel laterite by thermal plasma process, IMMT, Bhubaneswar. Dr. K Jayasankar, PI made a detailed presentation.	PERC members observed that Plasma processing is energy intensive and therefore techno-economics should be computed. The level of other impurities in Fe-Ni and its suitability for SS production is not fully examined by PI. PI to consider these and continue the work to obtain necessary results.
2.9	Development of State-of the art facilities for in-situ stress measurement by hydrofracture method in porous and fractured rocks, (NIRM), Karnataka	Project completion report to be sent to Prof Pathak, IIT KGP for review.
2.10	Development of portable analytical kit for field analysis of bauxite: Emphasis on in-situ micro-analysis of mineral entities for mineral prospecting,(JNARDDC),Nagpur Dr. Mohamed Najar P.A., Scientist,	Project completion report to be sent to Prof SP Mehrotra for Review
2.11	Process Development for production of low soda (Na2O) hydrate in bayer circuit, JNARDDC, Nagpur Dr. (Mrs) Suchita Rai, Scientist-III,	Project completion report to be sent to Prof SP Mehrotra for Review
2.12	Development of Mathematical Model (Using fuzzy logic) to control superheat of Aluminium Electrolysis Bath, (JNARDDC), Nagpur	Project completion report to be sent to Director, NFTDC for Review

Chairman observed that apart from the Project Completion report, a shorter report without revealing IP related information of the completed projects shall be prepared by the above organizations for putting up in the website under completed projects.

3. **Any Other Item**

3.1   Chairman observed that an approach paper be prepared for web - portal to handle all stages of processes from call for proposals to post completion dissemination.

3.2   Furthermore, a database of sanctioned projects and those not sanctioned will be prepared to facilitate impact analysis of past projects as well as avoid repetition.

4.   The meeting ended with thanks to the chair and the members.

List of new project proposals (14th PERC)

Project No.	Title of the project	Name of the institute/ organization
1.	Development of Fiber Bragg Grating (FBG) based chemical sensor for monitoring of hazardous toxic chemicals and gases in an underground mines	Indian School of Mines, Dhanbad
2.	ICT usage amongst the coal mine employees and its impact on their job performance.	Indian Institute of Technology, Roorkee
3.	Beneficiation of fine metal oxides by charges microbubble by developing a plant prototype	Indian Institute of Technology, Guwahati
4.	Ligand assisted/surfactant enhanced filtration for metal ion removal from water through tailor made membranes	Central Salt and Marine Chemicals Research Institute, Gujarat
5.	Road-cut rock slope stability studies using RMR, SMR and kinematic analysis along NH 58 from Karnaprayag to Joshimath: implications for safety of char dham yatra circuit	Aligarh muslim University, Aligarh
6.	Reduction in water consumption for removal of impurities from coal in coal washeries	Indian Institute of Technology, Roorkee
7.	Enhanced recovery of Manganese as electrolytic manganese dioxide (EMD) from Ferro manganese mine tailings through bioleaching	Siksha O Anusandhan University, Bhubaneswar
8.	Design and Development of an underwater robotic vehicle	Indian Institute of Technology, Kanpur
9.	To develop In-situ emission based failure detection and monitoring system for mines	Amity University, Noida
10.	Investigations into the feasibility of complete extraction of uranium ore form the underground workings of UCIL mines and devise a suitable method of working	Indian School of Mines, Dhanbad
11.	Evaluation of potential beach placer deposits of ambalapuzha-arattupuzha coastal sector, Kerala, India: Implications on the rare earth chemistry of monazite and altered characters of Ilmenite for synthetic rutile production	National Institute for interdisciplinary Science & Technology (NIIST), Thiruvananthapuram.
12.	Reclamation of valuable metals from spent refinery catalyst using hydrometallurgical techniques and preparation of closed loop process flow sheet	C.V.Raman college of engineering, Bhubaneswar
13.	Prospecting for rare earth (REE) minerals using remote sensing	Indian Institute of Technology, Roorkee
14.	Development of environment friendly blasting techniques	Indian School of Mines, Dhanbad
15.	Chemical Assessment of trace metals concentration in soil samples impacted by the activity of mines	Indian Institute of Technology, Kanpur
16.	Monitoring and characterization of airborne respirable dust generated in highly mechanized surface mines in India	Indian School of Mines, Dhanbad
17.	Experimental and Theoretical insights into the pre-carbobnization and refining of coal using deep eutectic solvents	Indian Institute of Technology, Guwahati
18.	Time series analysis of surface displacement of jharia, raniganj, korba and talcher fields using DInSAR (differential interferometric synthetic aperture radar) for the period from 2015 to 2018	Birla Institute of Technology and Science, Pilani
19.	A novel technique to estimate the concentration of fluoride in mines water	Gandhi Institute for Technological Advancement, Bhubaneswar
20.	A pilot study to map the minor occurrence minerals	Government of Arunachal Pradesh,

	(Gold, Platinoid, lead and zinc, base metal sulphide) using geospatial techniques in Arunachal Pradesh	Department of Geology and Mining, Itanagar
21.	Simulation of simultaneous rock fractures at multiple scales	Birla Institute of Technology and Science, Pilani
22.	Development of smart rock bolt system for monitoring of underground unit operations	Indian School of Mines, Dhanbad
23.	Sustainable development and energy generation through innovative implementation of solar energy	Indian Institute of Social Welfare & business management, Kolkata
24.	Development of standard protocol of field audiometry for notifying noise induced hearing loss	National Institute of Miners' Health, Nagpur
25.	Study and development of series-parallel hydraulic hybrid energy efficient excavator	Indian School of Mines, Dhanbad
26.	Petro-mineralogical and geochemical studies on the REE bearing carbonatite and other associated alkaline rock complexes of parts of shilling plateau, NE India	National Geophysical Research Institute, Hyderabad
27.	Investigation of energy conservation potential in mining industry through energy efficiency approaches with integration of onsite renewable energy sources	Gandhi Institute of Engg. And Technology, Gunupur, Odisha
28.	Process development for recovery of tungsten values from gold mine tailings	Indian School of Mines, Dhanbad
29.	Develop a CFD solver of slurry flow for designing of hydraulic conveying system of ore transportation	Amity University, Noida
30.	Towards greener and safer mines with wireless sensor networks	Amity University, Noida
31.	Developing downstream application of strip cast aluminium alloys (AA8011 & AA3004)	Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur, Visvesvaraya National Institute of Technology (VNIT), Nagpur (MS) and National Aluminium Company Ltd (NALCO), Bhubaneswar (jointly)
32.	Large scale digital database creation of bauxite & laterite deposits using geo-informatics technology for utilization by Aluminium industries	Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur and Maharashtra Remote sensing applications Centre, Maharashtra (jointly)
33.	Studies on assessment and extraction of rare earths from industrial waste-red mud	Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur and Geological survey of India, Kolkata (jointly)
34.	Synergistic utilization of aluminium industrial wastes for development of geopolymeric building materials	Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur and Swarnalata Holdings, Raipur (jointly)
35.	Development of an unpaved opencast mine haul road maintenance management systems in Indian context	National Institute of Technology, Rourkela
36.	Synthesis of rare earth based metallic glasses and study of their heavy fermion behavior	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
37.	Study on bio-elimination of mineral contents from coal for its energy enhancement by microbes	Kristu Jayanti College, Bengaluru
38.	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.	Indian School of Mines, Dhanbad

39.	Bioprocess development and scale up for augmented bioleaching of silica from low grade bauxite.	Gandhi Institute of Engineering and Technology, Gunupur, Odisha
40.	Study the feasibility of treatment of seepage water from chromite mine quarries of Odisha	National Institute of Technology, Rourkela
41.	Development and characterization of polymer composites using mining wastes for wear resistant applications	National Institute of Technology, Rourkela
42.	Recovery of gallium from red mud by floatation process	National Institute of Technology, Rourkela
43.	Applications of lower grade iron ores as mineral admixtures in concrete and their effects on mechanical performance of concrete	Amity University, Noida.
44.	Structural study of the baula ultramafic complex using micro-mesoscopic structural elements and melt inclusions: Its implication on developing a new strategy for prospecting and exploration of rare minerals of PGE in Bangur and extension areas of Kendujhar and balasore districts, Odisha	Indian Institute of Technology, Bombay
45.	Extraction of gold from mine waste using polyorganosulfur compounds	Amity University, Manesar, Haryana
46.	Expert system based strategy for uranium exploration using remote sensing, GIS and ground based survey	Indian Institute of Engineering Science and Technology, Shibpur, West Bengal and Indian Space Research Organisation, Kolkata (Jointly)
47.	Studies on Bi-beneficiation using marine oceanobacillus and halobacillus species with reference to iron ore and bauxite processing on laboratory scale	Amity University, Noida.
48.	Diagnosis of tuberculosis infection and identification of novel biomarkers among mine workers of India	National Institute of Miners' Health, Nagpur and Central India Insitute of Medical Sciences, Nagpur (jointly)
49.	Development of Cu-Zn shape memory alloy sheets for possible industrial applications	Advanced Materials and processes research Institute (AMPRI), Bhopal
50.	The effect of ultrasonication in different mineral beneficiation techniques to increase Fe content in iron ore slimes	RVS college of Enginnering and Technology Edalbera, Jamshedpur
51.	Energy saving processing system in mines employing automatic power factor correction involving automatic power factor correction (APFC) relay	Gandhi Institute for Technological Advancement, Bhubaneswar
52.	Development of hybrid aluminum foam core sandwich panels for noise and vibration attenuation	Advanced Materials and processes research Institute (AMPRI), Bhopal
53.	Multi-Scale quantitative composition activities relationship (MACAR) modeling for new A1 alloys development for value additions in aluminium industries	Konark Institute of Science & Technology, Bhubaneswar
54.	Ultrasound Assisted extraction of rare earth metals	Department of chemical engineering, Anna University,Chennai
55.	Effective utilization of fly-ash, an industrial waste, in composite making	Gandhi Institute of Technology Advancement, Bhubaneswar
56.	Noble and rare earth element distribution in laterities	Anna University, Chennai

	and their bearing on evolution of the western Indian marging	
57.	Prospecting, estimating and locating the rare earth element (REE) minerals present in carbonatite complexes of pakkanadu and hogenakkal areas of dharmapuri suture rift zone (DSRZ), Tamil Nadu: A geochemical and petrological approach	Periyar University, Salem, TamilNadu
58.	Surface modification of mining and mineral processing machineries by novel technique	Indian Institute of Technology, Kharagpur
59.	Development of new technology system for mineral exploration and mining in deep sea to locate and exploit new mineral resources	Amity University, Manesar, Haryana.
60.	Assessment of gold potentiality of the shimoga schist belt, western dharwar craton	School of earth Sciences, Central University of Karnataka, Kalaburgi, Karnataka
61.	Monitoring compliance of approved mining plan in an iron ore mechanized opencast mine using a Wi/Fi with integrated GPS based RFID solution	Indian Institute of Engineering Science and Technology, Shibpur, West Bengal
62.	Development studies on nano fly ash:A pozzolanic Material for production of Geo-polymer	Gandhi Institute for Technology Bhubaneswar
63.	Development of smart helmet:An innovative device for safety in Mines	Gandhi Institute for Technology, Bhubaneswar
64.	Developmental studies and industrial trial of fly ash based insulator & dielectrics under the thrust area of research in mines on "Extraction of value added products from mine waste, plant tailings etc.	Gandhi Institute for Technology, Bhubaneswar
65.	Development of aluminoum-magnesium-scandium alloys for aeronautical applications	National Institute for interdisciplinary Science and Technology, Thiruvananthapuram and National Aerospace Laboratories, Bangalore (Jointly)
66.	Low cost tripper assisted belt conveyor tension regulation using renewable power supply	Jeppiaar Institute of Technology, Chennai
67.	Environmental protection for toxic gas detection and landslide for mine safety	Jeppiaar Institute of Technology, Chennai
68.	Interactive mining web application system	Jeppiaar Institute of Technology, Chennai
69.	Earthquake prediction and mitigation using piezo electric sensors	Jeppiaar Institute of Technology, Chennai
70.	The single step co-production of pig iron and mineral wool from red mud using electric arc furnace-process design and experimental evaluation	Jawaharlal Nehru Technological University Kakinda, Vizianagaram, Andhra Pradesh
71.	Extraction of potash values from silicate rocks	Indian Institute of Technology, Roorkee
72.	Development of immobilized consortia to facilitate extraction of metals from low grade sulfidic ores.	Haldia Institute of Technology, West Bengal
73.	Mineralogical and geochemical characterization of Indian glauconites for alternative potassium fertilizers	Indian Institute of Technology,Bombay and NGRI, Hyderabad
74.	Behavior of underground openings under different ground conditions	Visvesvaraya National Institute of Technology, Nagpur
75.	Recyclability strategy or value-added utilization of iron/manganese ore tailing/ low grade ore:evaluation of energy storage capacities.	Institute of Minerals and Materials Technology, Bhubaneswar
76.	Characterization of control low strength materials for	National Institute of Technology,

	construction of unpaved haul road and back filling using mine tailings and fly ash.	Rourkela
77.	A framework for mineral exploration through hyperspectral image processing	VIT University, Vellore, Tamilnadu
78.	De-centralised multi-robot application for surveillance, environment monitoring and operational safety of open cast mines and adjoining areas	Central Mechanical Engineering Research Institute, Durgapur, West Bengal
79.	The study of aluminium based composite alloys focused on improving the performance and permanence of aluminium reinforced with carborundum and alumina	Jeppiaar Institute of Technology, Chennai
80.	Rare earth mineral concentration in the beach sands of uttara kannada coast:their economic viabilities and sustainable mining	SDM college of Engineering & Technology, Dhavalagiri, Dharwad
81.	Comprehensive study on environmental impact of iron ore mining in Joda-Badbil Area, Keonjhar District, Odisha:its Managment	Utkal University, Bhubaneswar
82.	Utilising overburden soil of NLC Mines, Neyveli for construction activities	VIT University, Vellore, Tamilnadu
83.	Development of advanced Mg based biodegradable alloy for biomedical implants	Indian Institute of Technology, Roorkee
84.	Coal pillar design considering the strain-softening response and long term behavior of the material	Indian Institute of Technology, Madras
85.	Bioremediation of toxic chromium contamination at mining sites using Antarctic algal isolates	Amity University, Noida
86.	Uncovering the bacterial consortium from mining soils : A boot step approach in Development of a Novel carbon sequestrating strategy	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur