48th meeting of Standing Scientific Advisory Group (SSAG) held on 20th November 2017 at 03.00 P.M in Aluminium Room, "D" Wing, Shastri Bhavan, New Delhi. The list of participants is enclosed at Annexure-A.

Secretary, Ministry of Mines and chairperson, SSAG welcomed the members to the 48th SSAG meeting. He mentioned that SSAG plays an important role in fostering R & D projects in mining, minerals and materials sector, mineral processing & recovery from waste, metal extraction and alloy development. The SSAG considered the various projects which were reviewed and recommended by the Project Evaluation and Review Committee (PERC).

Dr. Joyesh Bagchi, Director (Technical), Member Secretary, SSAG made a brief presentation on three stage review process of the project proposals conducted by PERC before recommending it to the SSAG. A total of 116 project proposals were received for the year 2017-18. The first stage comprised of preliminary screening of the proposals done by a team of experts constituted by Ministry of Mines, which recommended 27 project proposals for the next stage i.e. Project Evaluation and Review Committee (PERC). These project 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.27 project proposals were presented by the respective PIs and evaluated by the committee during the 16thPERC meeting held on 6th September 2017 at JNARDDC, Nagpur. The PERC under the Chairmanship of Shri Ram Karan, Economic Adviser, Ministry of Mines recommended 9 (Nine)Project proposals comprising of (i) One from Geosciences and Exploration (ii) Two from Mining (iii) Two from Mineral Processing & recovery from waste (iv) One from Metal Extraction (Metallurgical processes) and (v) Three in the area of Alloys, specialty materials and product, to SSAG for the third / final stage review.

The SSAG was briefed about the criteria adopted by PERC in evaluating the proposals at PERC level 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.

After detailed evaluation by the SSAG, the recommendations of all the nine projects is given below:

Category - 1 : Geosciences and Exploration related

4.1 Critical Mineral (non-fuel) Resources Index of India-for effective policy decisions on mineral and manufacturing sector of India, Council of Energy Environment and Water (CEEW), Thapar House, Janpath, New Delhi.

Total Cost :Rs. 36.29115 lakh
Duration :3 years

Ist Installment	2nd installment	3rd installment
Rs. 12.10 lakh	Rs.12.10 lakh	Rs. 12.09115 lakh

The final outcome shall consist of periodic updates on the list of critical minerals, in sync with national/global circumstances which will provide a single window access to relevant public data – critical for policy formulation and business decisions.

The project is approved by SSAG with the condition that two officers each from IBM and GSI shall be included by CEEW as a part of the project with a view to assist and monitor the development of the statistical tool / data of critical index of mineral commodities.

Category 2 : Mining Related

4.2 Development of a novel underground mining method for exploitation of Chromite deposits from friable orebody and host rocks of Sukinda Valley, Odisha, Department of Mining Engineering, IIT, Kharagpur.

Total Cost : Rs. 68.46 lakh
Duration : 3 years

Ist Installment	2nd installment	3rd installment
Rs. 36.15 lakh (Capital: Rs. 20 lakh and Recurring: Rs. 16.15 lakh)	Rs. 16.16 lakh	Rs. 16.15 lakh

The developed novel methodology will assist in conservation of mineral deposits of the country.

The SSAG noted that mining / exploration of friable rock mass of horizon still remains a challenging issue. The Member Secretary informed that Odisha Mining Corporation (OMC) has given a letter of support and provided site facility for undertaking the above project. The SSAG approved the project.

4.3 Processed Sea sand for construction and other purposes , Civil Engineering Department, Saveetha Engineering College, Saveetha Nagar, Thandalam, Chennai

Total Cost : Rs. 40 lakh
Duration : 2years

Ist Installment	2nd installment
Rs. 30 lakh (Capital: Rs. 20 lakh and Recurring: Rs. 10 lakh)	Rs. 10 lakh

The developed technique will be beneficial for use of processed sea sand for construction for cement concrete.

The SSAG noted that use of offshore sand for construction is a challenge for the country in near future. The SSAG approved the project with the above cost and duration. However, the PI will also include physical characterization of the offshore sand as a part of project objectives.

4.4 Estimation of Morphodynamicity and its remedial action using Red-mud based concrete at coastal zone of Eastern Odisha, Jawaharlal Nehru Aluminium Research Development & Design Centre, Nagpur and Indian Institute of Technology, Bhubaneswar (Jointly)

Total Cost : Rs. 30 lakh (JNARDDC: Rs. 15 lakh & IIT, Bhubaneswar: Rs. 15 lakh)

Duration : 6 months

JNARDDC, Nagpur

Ist Installment
Rs. 15 lakh

IIT, Bhubaneswar

Ist Installment
Rs. 15 lakh

The project outcome aims at developing a commercial process for the use of red mud as a raw material for manufacturing of red mud and geopolymer blocks.

The total Budget of the Project i.e. Part A and Part B is Rs. 143.4162 lakh. In line with the recommendation with the PERC, the SSAG approved the initial feasibility study in Part-A as above. Based on the results obtained in Part-A the full scale project may be considered in Part-B.

4.5 Nano Processing of Industrial Rejects for use as additives in Mix-designs for improved pozzolanic reaction efficiency, Jawaharlal Nehru Aluminium Research Development & Design Centre, Nagpur & Visvesvaraya National Institute of Technology (VNIT), Nagpur (Jointly).

Total Cost : Rs. 49.77170 lakh (JNARDDC: Rs. 37.69670 lakh & VNIT: Rs. 12.07500 lakh)

Duration: : 2 years

JNARDDC, Nagpur

Ist Installment	2nd installment

Rs 31.34 lakh (Capital: Rs. 25 lakh and Recurring: Rs. 6.34 lakh)	Rs. 6.35670 lakh

VNIT

Ist Installment	2nd installment
Rs 6.0375 lakh	Rs. 6.0375 lakh

A cost-effective way for preparation of nano-particles/nano-composites using industrial wastes as precursors rather than expensive chemicals will be achieved as the project deliverable.

SSAG noted that the project outcome would result in reduced used of binder (cement) which shall be substituted by the above nano-materials. SSAG also took note of the consent letter submitted from Industry with regards to utilization of the R&D outcome for economic and efficient building and construction work. The SSAGapproved the project.

Category : 4 Metal Extraction (Metallurgical processes) (1 Project)

4.6 Urban Li Battery Mining:Physio-Chemcial Separation of Used Li ion Batteries for Recovery of Li, Co, Ni active materials and Cu, Al metal, Nonferrous Materials Technology Development Centre, Kanchanbagh, P.O., Hyderabad.

Total Cost : Rs. 94.82 lakh (Ministry of Mines: Rs. 83.82 lakh and Central Electronics Ltd (CEL) and NFTDC: Rs. 11 lakh)

Duration : 2 years

Ist Installment	2nd installment
Rs 59.91 lakh (Capital: Rs. 36 lakh and Recurring: Rs. 23.91 lakh)	Rs. 23.91 lakh

The project will lead to effective separation of Battery Active Materials (Li, Co, Ni mixed oxides) – Cu and Al; & Electrolyte and eco-friendly processing of waste.

The SSAG observed that the project deliverable would result in pilot plant (TRL-7) level and technology could be transferred to a large no. of SMEs & MSMEs. SSAG advised that the PI should take care of the issues relating to framework for regulatory

mechanism for institutionalizing collection and recovery of the Li Battery. Central Electronics Ltd (CEL) and NFTDC shall support Rs 11 lakhs. The project is approved by SSAG.

CATEGORY : 5 Alloys, speciality materials and products

4.7 Development of Metal-Graphene Alloys, Department of Materials Engineering, Indian Institute of Science, Bangalore.

Total Cost : Rs. 20 lakh
Duration : 2 years

Ist Installment	2nd installment
Rs 10 lakh	Rs. 10 lakh

The project will be beneficial in developing a synthesis procedure for producing metal-graphene alloys.

The SSAG approved the project with the above cost and duration.

4.8 Fabrication of Advanced Ceramic Nanocoatings for Automotive Applications, Christ University, Bengaluru and Jawaharlal Nehru Aluminium Research Development & Design Centre, Nagpur (Jointly)

Total Cost : Rs. 43.75920 lakh (Christ University: Rs. 21.81250 lakh and JNARDDC: Rs. 21.94670 lakh)
Duration : 2 years

Christ University

Ist Installment	2nd installment
Rs 10.91 lakh	Rs. 10.9025 lakh

JNARDDC

Ist Installment	2nd installment

Rs 13.48 lakh (Capital: Rs. 5 lakh and Recurring: Rs. 8.48 lakh)	Rs. 8.4667 lakh

The project deliverables include development of a technology to prepare nano sized plasma spray powder from nano ceramic (commercial) compositions involving alumina and zirconia (in line with Make in India Concept) .

The SSAG noted that outcome of the project could lead to overall import substitution in the field of automotive sector applications. In line with PERC recommendation, the SSAG approved the above project with a reduced period of 2 years.

4.9 Value added Electrochemical Devices from Zircon obtained from Beach Sands of Odisha, Indian Institute of Technology, Bhubaneswar.

Total Cost : Rs. 36.04 lakh
Duration : 2 years

Ist Installment	2nd installment
Rs 29.425 lakh (Capital: Rs. 23 lakh and Recurring: Rs. 6.425 lakh)	Rs. 6.615 lakh

The project outcomes will lead to value addition of Zircon which will be a new product for IREL and the study may lead to establishment of downstream industries focusing on advanced zirconia components.
Member secretary informed that Interaction with IREL has been established and it is already on. The SSAG approved the project for a reduced duration of 2 years.

4.10 Any other item

PERC members informed that during the 16th PERC, it was proposed that JNARDDC may be asked to submit a complete proposal to Ministry of Mines on the status paper on the work carried out nationally and internationally on red mud to benchmark future investigation in the country for Rs. 25 Lakhs.

The report should contain the list of R&D work already done on red mud at national and international level. It should also suggest the areas in which future R&D can be taken up in red mud. Such a report could be put up on the public domain with a view to avoid receiving several duplicate project proposals in the same areas of research.

Project title - Status report on work carried out nationally and internationally on Red Mud to benchmark future investigation in the country, JNARDDC, Nagpur

Total Cost : Rs. 25.00 lakh
Duration : 1 year

Ist Installment
Rs 25.00 lakh

The project will lead to creation of a database which will be beneficial identifying the most promising and economical viable solution for bulk utilization of red mud.

The above proposal submitted by JNARDDC was examined and approved by SSAG.

5. Review the On-going Project for consideringextension of project.

The following nine projects were considered by the SSAG for review and extension of time. PERC had already recommended the extensions of the project without any cost overruns. In most of the cases, the time overrun was due to delay in supply of the capital item. Chairman (SSAG) / Secretary (Mines) suggested that the Project Implementing (PI) institutions should plan their procurement well in advance to avoid such delay in completion.

After detail evaluation, the SSAG approved the proposed time extension to all the nine projects as below:

i. Development of viable technique for assessment of reclaimed landand for safety of structures under settling environment, NIRM,Karnataka. (Extension granted upto 31st March, 2018).

ii. Estimation of seismic hazard in and around the mines out areas of Kolar Gold Fields, NIRM, Karnataka. (Extension granted upto 30th June,2018)

iii. Development of Super Thermal Aluminium (STAL) conductor for Indian Power Sector, NFTDC, Hyderabad and JNARDDC, Nagpur(Jointly) (Extension granted upto 30th September, 2017).

iv. Development of process for making value added materials from illemenite mineral, IMMT, Bhubaneswar. (Extension granted upto 30th September, 2017.)

v. Integrated approach for development of process models and production of aluminium alloy extrudates using porthole dies,JNARDDC, Nagpur (Extension granted upto 31st March, 2018).

vi. Development of low density emulsion explosives for energy efficientblasting in environmentally sensitive areas, Indian School of Mines,Dhanbad. (Extension granted upto 31st March, 2018).

vii. Development of Nickel containing steel from chromite over burden,IIT, KGP and IMMT, Bhubaneswar (Jointly) (Extension granted upto 31stMarch, 2018).

viii. Development of TDR based wireless system for slope stability monitoring in opencast mines, NIT Rourkela (Extension granted upto 31st December, 2017)

ix. Physico-chemical processing of low grade chromite ore for beneficiation and agglomeration of fines for recovery of metal values, Jadavpur University, Kolkata (Extension granted upto 31st December, 2018)

Member from DST also suggested that DST could be approached for funding on various projects related to nano-technology. SSAG welcomed the suggestion. The meeting ended with vote of thanks to the Chair.

Annexure-A

LIST OF PARTICIPANTS OF 48TH SSAG MEETING HELD AT ALUMINIUM ROOM, MINISTRY OF MINES, SHASTRI BHAVAN , NEW DELHI UNDER CHAIRMANSHIP OF SECRETARY (MINES) ON 20.11.2017

Sr no	Name	Portfolio
1.	Shri Arun Kumar	Secretary (Mines)
2.	Shri K Rajeswara Rao	Additional Secretary (Mines)
3.	Ms. Reena Sinha Puri	JS & FA (Mines)
4.	Shri Ram Karan	Economic Adviser (Mines)
5.	Shri Amit Saran	Director (Mines)
6.	Dr. J. Bagchi	Director (Technical) , Mines
7.	Dr.K.Balasubramanian	Director, NFTDC Hyderabad
8.	Dr. A. Agnihotri	Director, JNARDDC
9.	Shri Subrat Kar	GM (R&D), NALCO
10.	Dr. Sanjay Mishra	Advisor, DST
11.	Dr. P.K.Singh	Director, CIMFR, Dhanbad
12.	Shri Sivakumar Cherukuri	Director, NIRM
13.	Shri A. K. Gupta	DDG, GSI, Delhi

Leave of absence granted to other members.