GOVERNMENT OF INDIA
MINISTRY OF MINES

No.14/18/2008 – Metal IV

New Delhi, the 9th June, 2008.

To

1. Secretary,
   Ministry of Science & Technology,
   Technology Bhawan, New Mehrauli Road,
   New Delhi-110016

2. The Advisor (Minerals),
   Planning Commission,
   Yojana Bhavan,
   Sansad Marg, New Delhi.

3. The Director General,
   Geological Survey of India
   27, Jawaharlal Nehru Road,
   Kolkata – 700 019.

4. The Controller General,
   Indian Bureau of Mines,
   Indira Bhavan, Civil Lines,
   Nagpur– 440 001.

5. The Director,
   Defence Metallurgical Research Laboratory, P.O. Kanchan Bagh,
   Hyderabad.

6. The Director (Material Group),
   Bhabha Atomic Research Laboratory, Trombe,
   Mumbai – 450 085.

7. The Chairman & MD,
   National Aluminium Company Limited,
   NALCO Bhavan, P-2, Nayapalli,
   Bhubaneswar 751 007.

8. The Director,
   Regional Research Laboratory,
   Near Habibganj Naka,
   Bhopal

9. Dr. B.B. Dhar,
   Former Director, CMRI,
   D-20, Pamposh Enclave,

10. Dr. Pradip,
    Group Head,
    Tata Research Development & Design Centre, 54B Hadapsar
    Industrial Estate, Pune – 411 013.

11. Dr. K. Balasubrahmanian,
    Director,
    Non-Ferrous Material & Technology Development Centre,
    Kanchan Bagh, Hyderabad.

12. Dr. R.N. Gupta,
    Ex. Director, NIRM,
    C002 Gopalan,
    Celestial Greens, Old Madras Road
    Post Office, C.V.Raman Nagar,
    Bangalore – 560093.

13. Dr. I. Ahmed,
    Adviser,
    Ministry of Science & Technology,
    New Mehrauli Road,
    New Delhi-110016.

14. Dr. P.N. Razdan,
    Senior Dy. Director General,
    Geological Survey of India
    27, Jawaharlal Nehru Road,
    Kolkata-700 019.

Subject: 37th meeting of the Standing Scientific Advisory Group [SSAG].

Sir,

I am directed to forward herewith a copy of the Minutes of the 37th meeting of
the Standing Scientific Advisory Group [SSAG] held on 27th May, 2008 under the
Chairmanship of Secretary, Ministry of Mines for information and necessary action.

Encl: As above.

Yours faithfully,

[Signature]

R.K.Khera
Section Officer
Te. No. 24364196
Copy with the Minutes of the 37th SSAG meeting to:

1. Dr. A.K. Chakraborty, Scientist-in-Charge, (Fax 0712-2510311/2510604) Cenrral Institute of Mining & Fuel Research (CIMFR), Regional Centre, 3rd Floor, MECL Building, Seminary Hills, Nagpur-440 006.

2. Dr. S.S. Rathore, Associate Professor & Head (Fax 0294-2471056 /2470682), Department of Mining Engineering, College of Technology & engineering, Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan.

3. Prof. B.K. Mishra, Director, (Fax – 0674-2581160), Regional Research Laboratory, Bhubaneshwar-751 013 (Orissa).

4. Prof. Pradip Dutta, Principal Investigator, (Fax No. 91-80-23604536) National Facility for Semi-Solid Forming, Department of Mechanical Engineering, Indian Institute of Science, Bangalore-560012.

5. Dr. J. Mukhopadhyay, Director, JNARDDC, Opposite Wadi Police Station, Amrawati Road, Nagpur.

6. Dr. R.S. Mishra, JNARDDC, Opposite Wadi Police Station, Amrawati Road, Nagpur.

7. Dr. P.G. Bhuket, JNARDDC, Opposite Wadi Police Station, Amrawati Road, Nagpur.

8. Mr. R.N. Chouhan, JNARDDC, Opposite Wadi Police Station, Amrawati Road, Nagpur.

9. Dr. K.V. Ramana Rao, JNARDDC, Opposite Wadi Police Station, Amrawati Road, Nagpur.

10. Shri B.K. Mendiratta, General Manager, (Operations), (Fax- 033-228302478/2640, Tel. No. 2283-2226), Hindustan Copper Limited, 1, Ashutosh Chowdhury Avenue, P.B. No. 10224, Kolkata-700 019.

11. Dr. L.B. Sukla, Scientist, IMMT, Regional Research Laboratory, Bhubaneshwar-751 013 (Orissa)

12. Dr. Vishwanath Ammu, Scientist, JNARDDC Opposite Wadi Police Station, Amrawati Road, Nagpur.

13. Dr. R. Bimaroa, IIMT, Regional Research Laboratory, Bhubaneshwar-751 013 (Orissa)

Copy also to:

- (i) Sr. PPS to Secretary(M)
- (ii) PPS to Addl. Secretary(M)
- (iii) PS to JS&FA,
- (iv) Director(T)
- (v) Shri A.K. Bhandari, Advisor(TPCC).

(R.K. Khera)
Section Officer
The list of participants is placed at Annexure.

- The Chairman welcomed the participants to the 37th SSAG meeting and observed that the meeting is being held after a long gap but still the response from R&D organization and research institutions is not encouraging. The projects approved in last SSAG meeting are yet to be started. He suggested that the institutions should be given a reasonable time to initiate the approved projects failing which the funds allocated for their projects could be diverted to other projects.

- It was informed that the total budget outlay of the S&T programmes of the Ministry of Mines (MoM) for the year 2008-09 is Rs. 3.0 crores. The S&T projects of MoM are jointly supported by the Department of Science and Technology (DST) in the field of mining and metallurgy, beneficiation and bio-leaching. The value of current S&T projects and committed liability of the ongoing project comes to approximately Rs. 4.5 crores. It was mentioned that the project cost was paid in installments over the period of 2 to 3 years as per the duration of the project. Additional funding can be sought at the RE stage, if needed.

- Chairman / Secretary (Mines) suggested that the R&D institutions should take initiative for part funding of the projects through the beneficiary industry also.

- Shri. S. Vijay Kumar, Additional Secretary, Ministry of Mines observed that since the proposals put up for SSAG are first screened by the Project Evaluation and Review Committee (PERC), the PERC should meet more frequently so that proposals can be brought to SSAG at regular intervals. He also suggested that the Scheme should be adequately publicized by inserts in R&D Journals concerned, as well as direct contact with research institutes and universities.

- Dr. B. B. Dhar, Member was of the opinion that the SSAG should meet on a quarterly basis for proper monitoring of the programmes and their timely completion. He pointed out that the response from the research institutions and organizations are not adequate and suggested that PERC meeting may be rotated in different R&D institutions to bring awareness
• Dr. I. Ahmed, Member, remarked that the DST has a regular monitoring mechanism by way of Project Monitoring Committee (PMC) to ensure timely completion of the project and to suggest mid-term correction if required. The same system could be followed for the project approved by MoM.

• Shri A. K. Bhandari, Advisor, TPPC initiated the discussion on the agenda for the meeting and the PI's were requested to make presentation of their projects for consideration of the SSAG.

1. Confirmation of the Minutes of the 36th Meeting of SSAG

Confirmation of Minutes of the 36th meeting of SSAG held on 1st August, 2008. The minutes were confirmed.

2. Approval / Sanction of the New S&T Projects

2.1 Feasibility and Application of Bio-fuel as well as Low Cost and Diluted ANFO (Ammonium Nitrate Fuel Oil) for cost effective and safe blasting practices in Open Cast Metalliferrous Mines in India. Central Institute of Mining & Fuel Research (CIMFR), Nagpur – Dr. A. K. Chakraborty

The project was considered in the 2nd PERC meeting and recommend for approval. Dr. A. K. Chakraborty made the presentation. The project aims to:

- To develop economical and environmental friendly Ammonium Nitrate Fuel Oil (ANFO) explosive to achieve high productivity with improved safety
- Possible replacement of HSD (High Speed Diesel) with environmental friendly bio fuels / LDO (Light Diesel Oil) in ANFO explosive.
- Application of suitable ANFO explosive mix for various rock mass conditions for better fragmentation and for better rock explosive energy interaction.
- To frame guidelines for deep hole blasting with economical and environmental friendly ANFO with various blends / combinations explosive types.

It will benefit opencast Metal and non-Coal mines. The total cost of the project is Rs. 88,02,000. SSAG approved the project for the period of 36 months with MoM contributing Rs. 45 lakhs (Rs. 32 lakh as capital and Rs. 13 lakh as recurring expenditure). The rest of the expenditure will be met by CIMFR from its own resources.
Development of underground stoping method for soapstone mining in Rajasthan, Department of Mining Engineering, College of Technology & Engineering, Udaipur, Rajasthan – Dr. S. S. Rathore

Dr. S. S. Rathore made the presentation. The project aims to:

- Evaluation of techno-economically viable mining methods for exploitation of soapstone.
- Development and operation of a experimental stope based on the above study.
- Monitoring of stoping operations and suggestions for improvement.
- Monitoring of wall rock behavior during and after stoping operation.
- Application of the results obtained, in underground soapstone mines.

The Chairman enquired as to how the finding of the project will benefit the small mine owner of the region. Dr. Rathore informed that the project will be benefit about 100 soapstone mines in Rajasthan as the finding will be shared with them and the mine owners are also sharing part of the cost of the project.

The SSAG approved the project funding of the project at 20.6 lakhs (Rs. 16 lakhs as capital and Rs. 4.60 lakhs as recurring expenditure) for a duration of 24 months.

2.3 Characterization and dry beneficiation studies to enrich the Nickel content from the waste lateritic Nickel bearing chromite overburden materials of Sukinda, Orissa. Institute of Minerals and Materials Technology (IMMT), Bhubaneswar (formerly RRL) – Dr. L. B. Sukla

Project emphasizes the importance of dry beneficiation process for enhancing the nickel content of the feed of the nickel technology proving-plant thereby reducing the energy consumption over the conventional wet feed.

The SSAG approved the funding of the project to for Rs. 6.20 lakh (Rs. 2.88 lakhs under the salary / wages and rest under recurring expenditure) to completed in 24 months.

2.4 Microstructural characterisation of alloy billets cast in a linear electromagnetic stirrer – Indian Institute of Science, Bangalore – Dr. Pradip Dutta

In continuation to the R&D efforts associated with the recently completed project on Setting up of National Facility for Semi-Solid Forming (SSF) supported by MoM, DST and DRDO, the project aims to study the microstructural evolution due to re-heating of billets. The objectives are:
• Relating process parameters with microstructure of semisolid billets produced by a one-step rheocast process developed at IISc.
• Study of micro structural evolution due to reheating of billets by induction heating.

The projects aims to develop cutting edge technologies to meet the requirements of automobile industry. As advised by the 3rd PERC meeting, PI has revised the cost of the project.

The SSAG approved the project for duration of 24 months at the revised cost of Rs. 65.55 lakhs (permanent equipments Rs. 42 lakhs and recurring Rs. 23.55 lakhs). The contribution of MoM will be Rs. 23.55 lakhs and DST Rs. 42.00 lakhs.

2.5 Simulation and Die Design for Complex Aluminium Extruded profiles - JNARDDC, Nagpur – Dr. Vishwanath Ammu

The extrusion industry employs trial and error method in designing causing lot of time and cost over run. The major objectives of the project are:

• To develop computer aided die design using available simulation software.
• Validate the die at appropriate Extrusion Press with the support of local Extrusion Industry.
• To make customized die design for different kinds of alloys, different processing condition and complex profiles.

JNARDDC is proposing to have a collaborative work programme for die design with National Physical Laboratory, New Delhi.

The SSAG approved the project cost of Rs. 50 lakhs (non-recurring Rs. 30 lakhs and recurring Rs. 20 lakhs) for duration of 36 months to be funded by MoM.

2.6 Development of Friction Stir welding technique for Aluminium – JNARDDC, Nagpur – Dr. K. V. Ramanarao

Friction stir welding (FSW) is one of the promising technologies for joining of aluminium alloys. It is a relatively new solid-state welding process which is energy efficient and is used for many engineering applications. The major objectives of the project are:
• Design and Development of suitable friction stir welding tool and optimize the design parameters.
• Evaluations of mechanical and metallurgical properties of weld joints in terms of deformation defects and defect analysis.
• Applications of weld joints to development of new aluminium products.
• Emphasis will be on development of Al-Al and Al-MS welds as these find many applications for automotive industry.

The project will benefit the existing and future fabrication industry. It was suggested that the purpose of examining welding edges could be served by a Scanning Electron Microscope with less than 1 lakh times magnification costing about Rs. 70 lakhs.

The SSAG approved the project cost of Rs. 115 lakhs (machinery and equipment cost of Rs. 87.50 lakhs and recurring cost of Rs. 27.5 lakhs) for duration of 36 months. Out of the equipment cost of Rs. 87.50 lakhs DST will fund the cost of SEM Rs. 70.00 lakhs and MoM contribution will be Rs. 45.00 lakhs.

2.7 Preparation and certification of Aluminium alloys reference materials – JNARDDC, Nagpur- Dr. R. S. Mishra

The project was recommended by the 3rd PERC meeting. The proposed programme is to prepare certified reference materials (CRM) for Aluminium alloys and offer basic and advanced training courses regarding modern analytical quality assurance.

The work plans involves procuring aluminium alloys with varying composition and basic homogenized materials for CRM and preparation. These will be analyzed by multiple laboratories for major and trace elements. The resulting analysis will be compared and best values determined.

SSAG approved the project for duration of 24 months at a cost of Rs. 30 lakhs to be funded from MoM.

2.8 Bauxite Technical Data Bank Phase – III, Western Ghat Deposits – by JNARDDC, Nagpur – Dr. P. G. Bhukte

This project was approved earlier by PERC subject to the signing of the Memorandum of Understanding with Geological Survey of India which has now been completed. The work is a continuation of earlier project and the focus will be on the compilation of data on Bauxite and Laterite of the Western Ghats. The earlier project reports have been well taken by the Industry.
The SSAG approved the project at a cost of Rs. 29.30 lakhs and the project duration will be 36 months. DST will fund Rs. 14.5 lakhs (cost of Petrological Microscope for Rs. 9.5 lakhs and Geostatistical Software for Rs. 5.00 lakhs) and the Ministry of Mines Rs. 14.80 lakhs being the recurring cost.

2.9. Study of die filling semisolid casting of Aluminium components – IISc, Bangalore (Cost Rs. 69 lakhs) - Dr. Pradip Dutta

The project was considered in the 3rd PERC meeting. The objectives of the project are:

- Study of rheological properties of reheated semisolid billets
- Computational modelling of die filling during semisolid casting

Since the component developed will be critical to automotive and aircraft industry, the PI was advised to seek participation and support from the Industry and to revised the cost suitably.

Dr. Dutta informed that the project cost has been revised to Rs. 46.00 lakhs (permanent equipment for Rs. 25 lakhs and recurring cost to be Rs. 21 lakhs).

The SSAG approved the project for the duration of 24 months and the project cost of Rs. 46 lakhs. The contribution of MoM of Rs. 21 Lakhs and DST of Rs. 25 lakhs respectively.

3. Other item: Bio-leaching of lean sulphide / chalcopyrite ore at Malanjkhand copper project HCL, IMMT, Bhubaneshwar & NML, Jamshedpur - (Cost Rs. 101.30 lakhs) Dr. B. K. Mendiratta

The project was approved in 35th SSAG meeting held on 25.10.2005. Later IMMT (RRL), Bhubaneshwar suggested the change in methodology from column leaching to heap leaching for technical reasons. SSAG approved the project in its revised form at a cost of Rs. 101.30 lakhs. Contribution of MoM will be Rs. 64.81 lakhs and HCL will contribute Rs. 36.49 lakhs.

The meeting ended with the vote of thanks to the Chair.

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<td>1.</td>
<td>Sri. J. P. Singh, Secretary (Mines)</td>
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<td>Sri. S. Vijay Kumar, Additional Secretary (Mines)</td>
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<td>Sri. Sanjeev Mittal, JS &amp; FA</td>
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<td>Prof. R. N. Gupta, Ex-Director, NIRM</td>
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<td>Sri. C. S. Gundewar, C.O., DO, IBM (representing CG, IBM)</td>
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<td>Dr. K. Balasubramanian, Director, NFTDC</td>
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<td>Prof. B. B. Dhar, Ex-Director, CMRI/CSIR</td>
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<td>Dr. I. Ahmed, Advisor, DST (representing Secretary, DST)</td>
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<td>Dr. P. N. Razdan, Senior Dy. Director General, GSI (representing DG, GSI)</td>
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<td>Sri. C. R. Pradhan, CMD, NALCO</td>
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<td>Sri. A. K. Bhandari, Advisor, TPPC</td>
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<td>Dr. K. Ayyasami, Director, MOM</td>
<td>Member-Secretary</td>
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<td>Dr. J. Mukhopadhyay, Director, JNARDDC, Nagpur</td>
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<td>Sri. M. B. K. Nair, GM (R&amp;D), NALCO</td>
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<td>Dr. A. K. Chakraborty, Scientist, CMRI</td>
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<td>Dr. S. S. Rothore, Head, Dept. of Mining Engineering, College of Tech. &amp; Engg, Udaipur</td>
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<td>Dr. R. Bhimrao, Scientist, IMMT.</td>
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<td>Dr. L. B. Sukla, Scientist, IMMT, Bhuvaneshwar</td>
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<td>Dr. B. K. Mendiratta, GM (Op.), HCL, Kolkata</td>
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<td>Dr. K. V. Ramanarao, Scientist, JNARDDC</td>
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<td>24.</td>
<td>Dr. P. Dutta, Professor, IISc, Bangalore</td>
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Absentees (Members):
1. Director, DMRL, Hyderabad
2. Director, (Material Group), BARC, Trombe, Mumbai
3. Director, RRL, Bhopal
4. Dr. Pradip, Group Head, TRD&DC, Pune