GOVERNMENT OF INDIA
MINISTRY OF MINES

No.14/25/2008 – Metal IV

New Delhi, the 3rd 2009.

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, Pampush 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,
    Celestian 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.

Subject: 38th meeting of the Standing Scientific Advisory Group [SSAG].

Sir,

I am directed to forward herewith a copy of the Minutes of the 38th meeting of the Standing Scientific Advisory Group [SSAG] held on 18th December, 2008 under the Chairmanship of Secretary (Mines), Ministry of Mines for information and necessary action.

Encl: As above.

Yours faithfully,

(Dr. K.Ayyasami)
Director (T)
Te. No. 23384592
Copy with the Minutes of the 38th SSAG meeting:

1. Dr. B.K. Mahapatra, Principal Investigator, IMMT, Regional Research Laboratory, Bhubaneswar-751013.

2. Dr. K. Balasubramanian, Principal Investigator, Non-Ferrous Materials Technology Development Centre, P.O. Kanchanbagh, Hyderabad-599958 AP.

3. Shri B.M.P. Pingua, Scientist and HOD, Central Institute of Mining and Fuel Research, Barwa Road, Dhanbad-826001.

4. Dr. J. Mukhopadhyay, Principal Investigator, Jawaharlal Nehru Aluminium Research Development and Design Centre, Amravati Road, Wadi, Nagpur-440023.

5. Prof. Dr. P.K. Jena, Principal Investigator, Institute of Advance Technology Environment (IATES), Plot No. 80A-81A, Lewis Road, Bhubaneswar-751002.

6. Dr. Ashok Kumar, Principal Investigator, Mecon Limited, Ranchi-834002 with a request to make a presentation w.r.t. 2.1 in agenda.

7. Dr. Pradip Dutta, Principal Investigator, National Facility for Semi-Solid Forming, Deptt. of Mechanical Engineering Indian Institute of Science, Bangalore with a request to make a presentation w.r.t. 2.2 in agenda.

8. Director IMMT, Regional Research Laboratory, Bhubaneswar-751013 (Orissa). (Fax 0674-2581160)

9. Director, Non-Ferrous Materials Technology Development Centre, Hyderabad.

10. Director, Central Institute of Mining & Fuel Research, Dhanbad-826004.

11. Director, Jawaharlal Nehru Aluminium Research Development and Design Centre, Amravati Road, Wadi, Nagpur-440023.

12. Director, Principal Investigator, Institute of Advance Technology Environment (IATES), Plot No. 80A-81A, Lewis Road, Bhubaneswar-751002.

13. Director, Principal Investigator, Mecon Limited, Ranchi-834002.


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).
The list of participants is placed at Annexure.

- The Chairman welcomed the members and participants to the 38th SSAG meeting convened to consider the Science and Technology (S&T) projects by the Ministry of Mines (MOM). He expressed his concern over the inordinate delay in the completion of projects. In addition to the Project Monitoring Committees of the various institutions, the Project Evaluation and Review Committee (PERC) should play a role in assessing the progress of the projects funded by Ministry of Mines as it affected the funding, etc. Evaluating the completed S&T projects in terms of utility to the industry should also be done. The R&D institutes are to move forward and keep to the time schedule and bench marks.

- 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. 300 lakhs. The Chairman opined that with limited budget available with MOM, it will be prudent to ascertain available budget and approve projects accordingly. It was informed that some of the S&T projects are jointly funded by DST and additional funding during the next financial year will be proposed as per the approved programmes.

1. Confirmation of the Minutes of the 37th Meeting of SSAG

The minutes of the 37th meeting of SSAG held on 27th May, 2008 were confirmed.

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

Agenda: 1

Project Title: Characterization and Optimum utilization of Manganese Ore Resources of Orissa - IIIMT, Bhubaneswar by Dr. B. K. Mohapatra, Scientist

Duration: 36 months

Project Cost: Rs. 27 Lakhs

Objective:

i. Mineralogical and geochemical characterization of manganese ores from mine dumps, in-situ ore bodies and associated Mn-bearing rocks from three manganese formations of Orissa and for their upgradation by different physical beneficiation techniques.

ii. Leaching studies of processes for manganese salt preparation and value addition.

iii. Removal of phosphorus from phosphorous-rich Manganese ore through bacteria leaching.
iv. Development of flow-sheet and pre-feasibility study on optimum utilization.

The Manganese ore resources occur in 3 areas in Orissa State and all have different phosphorous content due to the origin and disposition of the deposits in different rock settings and are to be evaluated separately for their characterization. Sri Kanchan, Dy. D.G., GSI enquired if the samples of Sausar area in Madhya Pradesh could be collected and checked. Sri Gundeswar, IBM said that the Central Indian Manganese was treated for beneficiation by IBM and it has its iron content which should be treated separately that requires a separate flow sheet.

<table>
<thead>
<tr>
<th>BUDGET (Rupees in lakh)</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (Non-recurring)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Recurring</td>
<td>7.47</td>
<td>7.51</td>
<td>7.52</td>
<td>22.5</td>
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<td>Institutional Overhead</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>4.5</td>
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<tr>
<td>Total</td>
<td></td>
<td></td>
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<td>27.0</td>
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</table>

Project was approved at a cost of Rs. 27 lakhs over duration of 3 years with yearly grant of Rs. 9 lakhs.

Agenda: 2

Project Title: Thin film and thin wire sensors for metallurgical industries - Non-Ferrous Materials Technology Development Centre, Hyderabad by Dr. V. S. Raghunathan, Scientist

Duration: 36 months

Project Cost: Rs. 312 lakhs

Objective: While the local sensors that sense and enable control are needed in all the metallurgical and Mining industries, the present proposal targets three specific applications with the expectation that while the development may be for specific situations, the methodology will be robust and be based on sound scientific principles.

i. Demonstration of a thin film sensor for use in Cu melting and casting Furnace.

ii. Foil sensor based on fine wires will be made and demonstrated, mainly as a strain sensor.

iii. Gas sensors for detecting and measurement of CO₂, water vapour and H₂S, etc. which are crucial in metallurgical processes.

Dr V S Raghunathan, Scientist, NFTDC made a presentation. He explained that the sensors are divided into thin film and thin wire sensors. The thin film is a sensing element that will go into the different types of sensors that are used in devises used in automobile, mining and environment sectors. The project requires a clean room facility and instruments for manufacture of thin films. The Chairman appreciated the
concept of the project and observed that the product resulting out of this S&T project may benefit many manufacturing units. The Chairman enquired if the thin film is manufactured anywhere in the world. It was informed that these are being used abroad but importing the knowhow is difficult. Keeping in view that they will have wide applications, the Chairman observed that DST should do the major funding as the results are expected to benefit various industries including mining.

Dr. I. Ahmed, Member representing Department of Science and Technology opined that there is some difficulty with the funding of this magnitude and that immediately 25% of the annual cost may be funded by DST in the current financial year and subsequent years funding of 30% of the budgetary cost will be considered. Dr B B Dhar, Member observed that NFTDC is a compact and excellent laboratory. The project will be approved subject to the availability of funds.

<table>
<thead>
<tr>
<th>BUDGET (Rupees in lakh)</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (Non-recurring)</td>
<td>120</td>
<td>106.5</td>
<td>55.5</td>
<td>281</td>
</tr>
<tr>
<td>Recurring</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Overhead (7%)</td>
<td>6.5</td>
<td>6.5</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>110.5</td>
<td>58.5</td>
<td>312</td>
</tr>
</tbody>
</table>

The total outlay for this project is Rs. 312 lakhs and the institution will fund Rs. 50 lakhs from its own resource (with Rs. 25 lakhs each for the first and second years). The first year outlay will be Rs. 101 lakhs (apart from Rs. 25 lakhs from institution), out of which DST will be funding Rs. 25 lakhs. An amount of Rs. 51 lakhs is to be funded by the Ministry of Mines subject to the availability of funds.

**Agenda: 3**

**Project Title:** Development of water resistant ANFO for blasting in watery holes-Central Institute of Mining & Fuel Research, Dhanbad, by Sri. B. M. P. Pingua, Scientist

**Duration:** 36 months

**Project Cost:** Rs. 26.28 Lakhs

Objective: 1. Selection of ammonium nitrate frill, size, density, porosity and pore distribution

2. Development of facility of measurement of oil absorption capacity of pores.

3. Design and development of water resistant fuel composition of mixing process.
4. Study of water resistant properties of ANFO i) water percentage with time delay ii) booster sensitivity iii) loading density, and iv) Velocity of detonation and fume quality, etc.

5. Field evaluation of hard rock mines including iron ore and limestone mines and also in a few other mines.

6. Improvement of water resistance sensitive ANFO suitable for tunneling and earth excavation work at low temperature.

The PI presented the project wherein he observed that AFNO is poor water resistant explosives and its application gets restricted during the monsoon season producing poor blast yields. Huge commercial gain is expected for the firms doing tunneling and other geotechnical work in the Himalaya that require blasting. It may be used in coal mines that have water seepage and related ground water saturation problems.

<table>
<thead>
<tr>
<th>BUDGET (Rupees in lakh)</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (Non-recurring)</td>
<td>9.00</td>
<td>2.55</td>
<td>0.00</td>
<td>11.55</td>
</tr>
<tr>
<td>Recurring</td>
<td>3.16</td>
<td>4.16</td>
<td>3.03</td>
<td>10.35</td>
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<tr>
<td>Overhead (20%)</td>
<td>1.46</td>
<td>1.46</td>
<td>1.46</td>
<td>4.38</td>
</tr>
<tr>
<td>Grand Total</td>
<td>12.16</td>
<td>6.71</td>
<td>3.03</td>
<td>26.28</td>
</tr>
</tbody>
</table>

The total cost of the project will be Rs. 26.28 lakhs and is approved with yearly contribution of Rs. 12.16 lakhs, 6.71 lakhs and 3.03 lakhs respectively.

**Agenda: 4**

**Project Title:** Management of Bauxite Residue (Red Mud) by JNARDDC, Nagpur by Dr. Chadda, Scientist

**Duration:** 48 months

**Project Cost:** Rs. 434.67 lakhs

**Objective:** The project envisages the utility of red mud generated during the process of manufacture of Alumina which is now lie unused and may pose an environmental problem in future. The project comprises of 4 activities:

(i) Development of stabilised blocks from admixture of mainly red mud, fly ash and Portland cement
(ii) Bench scale studies for development of glass ceramics
(iii) Development of light weight aggregates
(iv) Use of red mud as soil amendments and fertilisers

During the presentation, the Chairman observed a High Temperature Furnace is included in the project to a value of Rs. 25 lakhs and enquired if a furnace cannot be hired for testing. The possibility seems to be
remote. The test materials that were made like red mud and flyash treated tiles and porous foam products were shown to the members. It was suggested their utility in indoor decoration/flooring may be ascertained.

As to the activity (i), NALCO informed that sufficient progress has been made by it in the project and JNARDDC need not pursue it independently but by joining hands with NALCO; and for the activity (iv), as it entirely deals with soil amendments, the Chairman advised to find out from various soil survey/study institutes (Central Arid Zone Research Institute, Jodhpur) if such work is being done by them and whether they will be able to take up such projects on their own.

The JNARDDC should go ahead with the projects (ii) and (iii) and proportionately reduce its budget and the MOM funds for the manpower.

**Bench Scale Studies for Development of Glass Ceramics**

<table>
<thead>
<tr>
<th>BUDGET (Rupees in lakh)</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (Non-recurring)</td>
<td>50</td>
<td>80</td>
<td>--</td>
<td>130</td>
</tr>
<tr>
<td>Recurring</td>
<td>15.54</td>
<td>9.72</td>
<td>14.9</td>
<td>40.16</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td>170.16</td>
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</tbody>
</table>

**Development of Light Weight Aggregates & Foam Products**

<table>
<thead>
<tr>
<th>BUDGET (Rupees in lakh)</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment (Non-recurring)</td>
<td>40</td>
<td>15</td>
<td>--</td>
<td>55</td>
</tr>
<tr>
<td>Recurring</td>
<td>14.54</td>
<td>8.72</td>
<td>13.9</td>
<td>37.16</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td></td>
<td></td>
<td>92.16</td>
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</table>

As for the project budget, MOM may fund Rs. 77.32 lakhs (Recurring) and NALCO which is a beneficiary as a result of this project when red mud is being put to use, may bear all equipment costs.

*Agenda 5:*

Project Title: Survey, Assessment of Water Quality and Scope for Harvesting Water in the Iron and Manganese Ore Mines of Orissa by Prof. Jena, Institute of Advanced Technology and Environment Studies, Bhubaneswar, Orissa

Prof. Jena could not attend the meeting.

*Agenda 6:* It was decided to arrange to present two completed projects funded by MOM to know about the project results and the utility of these projects in the mining/metallurgical industry.
6.1 Project Title: Studies on production of Alloyed Pig Iron and Low Alloyed/Stainless Steel using Chromite overburden – Dr Ashok Kumar, MECON, Ranchi.

The objective is to develop new process technology for economic utilization of waste chromite overburden material through mineral value addition. Project commenced in 1999 was successfully completed in 2005 with funding from MOM (Rs. 78.75 lakhs), DST and MECON. Chromite overburden is a waste material that is generated in huge quantities during mining of chromite ore. A pilot scale trial was carried out to see if the presence of Fe, Ni and Cr in the overburden could be exploited. Encouraged by the pilot scale studies, the trial for about 250 tonnes of alloyed pig iron was produced successfully. The samples were converted from fine to cintering and processed for low alloyed Steel. It is a major innovation for converting waste into wealth. A Technical Feasibility Report was submitted by the Principal Investigator. The capacity of the proposed plant will be 800 tonnes per day and it may cost around Rs. 180 crores. The Chairman desired that this should be taken up companies like SAIL and JINDAL.

Dr I Ahmed of DST suggested that the proposal could be sent to Technical Development Board.

6.2 Project Title: National Facility for Semi-solid forming - Prof. Pradip Dutta of Indian Institute of Science (IISc), Bangalore.

Prof. Dutta gave a detailed presentation on the project. He informed that the aluminium billets when treated at semi-solid farming (SSF) state is more durable and light weight than the aluminium treated after plain heating and pouring of the metal. Two patents have been prepared and submitted. MOU exists between IISc and MOM on the patents. The project was completed in July, 2007 with a funding of Rs.700 lakhs. Since then, the National Facility is now fully operational. As regards to the downstream products with respect to SSF, NALCO may consider a long term project and commercialization. As a sequel to this project two SSAG projects of IISc were sanctioned.

In the concluding remarks, the Chairman suggested that the R&D institutes should have a more focused approach in executing the S&T projects and keep to the time schedule. He desired that we should take up the projects subject to the availability of funds. There should be more interaction between ministry and stakeholders. DST may contribute up to 30% of the project costs. If more projects are submitted and evaluated by MOM for consideration for funding, then Planning Commission should be approached by SSAG for more funds.

The meeting ended with the vote of thanks to the Chair.
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<tr>
<th>Sl. No.</th>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>1.</td>
<td>Sri. Shantanu Consul, Secretary (Mines)</td>
<td>Chairman</td>
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<tr>
<td>2.</td>
<td>Sri. S. Vijay Kumar, Additional Secretary (Mines)</td>
<td>Member</td>
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<tr>
<td>3.</td>
<td>Prof. R. N. Gupta, Ex-Director, NIRM</td>
<td>Member</td>
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<td>4.</td>
<td>Sri. C. S. Gundewar, Acting CG, IBM</td>
<td>Member</td>
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<td>5.</td>
<td>Prof. B. B. Dhar, Ex-Director, CMRI/CSIR</td>
<td>Member</td>
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<td>6.</td>
<td>Dr. I. Ahmed, Advisor, DST(representing Secretary, DST)</td>
<td>Member</td>
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<td>7.</td>
<td>Dr. V.K. Kanchan, Dy. Director General, GSI</td>
<td>Member</td>
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<td>(representing DG, GSI)</td>
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<td>8.</td>
<td>Sri. C. R. Pradhan, CMD, NALCO</td>
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<td>9.</td>
<td>Sri. A. K. Bhandari, Advisor, TPPC</td>
<td>Member</td>
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<td>10.</td>
<td>Dr. K. Ayyasami, Director, MOM</td>
<td>Member</td>
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<td>11.</td>
<td>Dr. Navin Chandra, Acting Director, AMPRI</td>
<td>Member</td>
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<td>12.</td>
<td>Dr. J. Mukhopadhyay, Director, JNARDDC, Nagpur</td>
<td>Member-Secretary</td>
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<td>13.</td>
<td>Dr. B. K. Satpathy, DGM, NALCO</td>
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<td>14.</td>
<td>Dr. V. S. Raghunathan, Chief Scientists, NFTDC</td>
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<td>15.</td>
<td>Dr. B. K. Mohapatra, Scientist, IMMT, Bhuvaneshwar</td>
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<td>16.</td>
<td>Dr. M. Palaniappa, Scientist, NFTDC</td>
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<tr>
<td>17.</td>
<td>Dr. B. M. Pingua, Scientist, CIMFR, Dhanbad</td>
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<td>18.</td>
<td>Dr. Nabiullah, Scientist, CIMFR</td>
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<td>19.</td>
<td>Dr. Ashok Kumar, DGM, MECON, Ranchi</td>
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<td>20.</td>
<td>Prof. Pradip Dutta, Professor, IISc, Bangalore</td>
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<td>21.</td>
<td>Dr. N. Najma, Scientist, JNARDDC</td>
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<td>Dr. U. Singh, Scientist, JNARDDC</td>
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<td>23.</td>
<td>Sri. M.J. Chaddha, Scientist, JNARDDC</td>
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<td>24.</td>
<td>Sri. M T. Nimje, Scientist, JNARDDC</td>
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