The Jawaharlal Nehru Aluminium Research Development and Design Centre, (JNARDDC), Nagpur

JNARDDC an Autonomous Body of Ministry of Mines is a “Centre of Excellence” set up in 1989 as a joint venture of Ministry of Mines, and UNDP with a view to provide major R&D support system for the emerging modern aluminium industry in India.

The objective of the Centre is to assimilate the technology available in the country and abroad for the production of alumina & aluminum including aluminium alloys as well as develop technical know-how for the basic engineering process and downstream areas and to provide training to the personnel employed in the Indian aluminium industries.

The centre also provides technological support for setting up Alumina refinery in the country. In the process the Centre caters R&D needs of both Primary and Secondary Producers.

Major activities

With a total strength of 48 employees (including 18 Scientists), during April-December, 2011, the Centre has six ongoing projects of National Aluminium Company Ltd. (NALCO) and one project of DRDO / DMRL, Hyderabad.

The Centre successfully completed three major S&T projects awarded by Ministry of Mines and final report is under preparation. Several projects are under negotiation with NALCO, DST, Gujarat Mining Development Corporation (GMDC, Ahmedabad), Hindustan Zinc Ltd., Ministry of Environment & Forests (MoEF), ABS&T Co., HINDALCO VEDANTA etc and also with international companies such as CANMET-Canada, CISRO-Australia etc.

Ongoing projects of Industry / Others are given at Table 13.4.

Table 13.4

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Agency</th>
<th>Project title</th>
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<tbody>
<tr>
<td>(i)</td>
<td>NALCO, Angul</td>
<td>Development of a probe for Liquidus Temperature Determination of Electrolysis Bath</td>
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<td>(ii)</td>
<td>NALCO, Angul</td>
<td>Techniques and tools for PFC measurements in aluminium electrolysis cells on lab. Scale</td>
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<tr>
<td>(iii)</td>
<td>NALCO, Angul</td>
<td>Study of effect of alumina quality on solubility in Electrolytic bath on lab. Scale</td>
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<td>(iv)</td>
<td>NALCO, Angul</td>
<td>Development of high speed extrusion alloys for the Indian Aluminium Industry</td>
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<td>(v)</td>
<td>NALCO, Damanjodi</td>
<td>Infrared thermography studies at Alumina Plant [2011-12]</td>
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<tr>
<td>(vi)</td>
<td>DRDO / DMRL, Hyderabad</td>
<td>Indigenization and development of wrought Aluminium Alloys for Indian Defence,(Under approval)</td>
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<tr>
<td>(vii)</td>
<td>NALCO, Bhunaneswar</td>
<td>Management of Bauxite Residue (AP-7)</td>
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Science & Technology Projects

- Bauxite Technical Data Bank Phase-III, Western Ghat Deposits
- Preparation & Certification of Aluminium Alloy Reference Materials
• Simulation and Computer aided die design for complex profiles of Aluminium Extrudes
• Development of Friction Stir Welding Technique for Aluminium-Steel Joint
• Development of rapid analytical procedures for Nickel, Chromium and Cobalt

Publication and Awards

• The Scientists of the Centre presented / published 11 technical papers in international & national seminars/journals in 2010-11. JNARDDC scientists won the prestigious “Dr. P.D. Sethi Annual Award - 2010” for best research paper on application of TLC / HPTLC. Similarly, the research paper on Quantitative Determination of Al3+ in Bauxite by Ocular Thin Layer Chromatography is under review for publication in The Arabian Journal of Chemistry (Production and Hosting by Elsevier B.V. Amsterdam, on behalf of King Saud University, Saudi Arabia). Similarly two other research papers of TLC / HPTLC are under communication for publication in “Separation Science and Technology”, ( Taylor & Francis, Inc., 325 Chestnut Street, Suite 800, Philadelphia, PA 19106, USA) and “Journal of Chromatography” A, Elsevier B.V. Amsterdam USA.
• The project on Pilot scale development of process technology for manufacturing of constructional blocks / bricks and artificial ceramic stone chips utilizing red mud undertaken by JNARDDC, NALCO & MRCPL was nominated as one of the best project for “India Innovation Initiative-i3 National Fair 2011” by Department of Science & Technology (DST), and Confederation of Indian Industry (CII) after clearing the regional level at IIT, Kharagpur.

Finances :

An internal revenue of ` 1.85 crore was generated in 2010-11 through various external projects and testing work.

Centre for Techno Economic Mineral policy Options (C-TEMPO)

Centre for Techno Economic Mineral policy Options (C-TEMPO) has been set up as a society under the aegis of Ministry of Mines with an objective to address the technology and management gaps for non ferrous and ferrous minerals and to facilitate effective interaction between the investors, entrepreneurs, mining industry and the Central and State Governments and evolve non binding techno economic advice in relation to mineral sector. In tune with its objective the centre undertook activities as under

(a) Technology Sub-Sector

Strategy for exploration and development of nickel and Platinum Group Elements resources in India No production and rising demand, makes India a total importer of Nickel. Centre is assessing the possibilities of indigenous production of Nickel from Chromite overburden, Sukinda Valley based on the available technologies with the involvement of the stakeholders.

Exploration techniques and technology for location and development of deep seated metals in India

With the exhaustion / fast decline of the mineral deposits within shallow depths and for meeting the increasing demand of metals, centre has prepared technical publications on Location & development of Deep Seated Metalliferous Deposits in India.

(b) Paper on Rare Earth Metals

The technological advances of the past few decades are bringing demand for rare earth metals which is influencing the mining industry. A Steering Committee has been constituted in
the Ministry of Mines with Secretary (Mines) as Chairman and Chairman CSTEP as Co-Chairman. Based on the inputs provided by the steering committee members, approach paper will be finalized by CSTEP and C-TEMPO.

An initiative has been taken by Ministry of Mines to review the status of availability of Rare Earth Elements (REE) and Energy Critical Elements (ECE) in the country. A Steering Committee Chaired by Secretary (Mines) and Co-Chaired by Chairman, Center for Study of Science, Technology and Policy (CSTEP), with representation from DST, BARC, MNRE, DRDO, CSIR, DAE, GSI IREL and C-TEMPO has been constituted in the Ministry to Identify all the techno-economic issues for long term national raw materials strategy and preparing a strategy paper for the Government providing short, medium and long term options along with proposals for specific policy and legislative interventions.

(c) Economic Sub-Sector

Preparation of Country Dossiers on Geology and Mineral Resources of mineral rich countries and MoU country.

Updated knowledge of the geology, mineral commodities in terms of their production, exports, and investment opportunities in mineral rich countries is vital in view of the growing demand of minerals in India to sustain the GDP and also from the view of strategic planning. The centre has prepared Country Dossiers on Australia, China, Canada, Iran, South Africa, Chile and Colombia in respect of their geology, mineral resources, export import potential, MoUs signed with India, bilateral Visits of delegation etc & uploaded on the website of C-Tempo.

(d) Techno Economic Policy Sub-Sector

Study on Pelletization of Iron Ore Fines in India and utilization of low grade iron ore and fines. The National Steel Policy envisages investment in modern mining and beneficiation methods for value addition and utilization of iron ore fines. There is need to focus on utilization of low grade iron ore, iron ore fines and iron ore tailings/slimes accumulated over the years. Centre has brought out technical paper entitled “Relevance of Iron Ore Pelletisation Industry in India-A Perspective” which has been uploaded on its website.

In addition to above C-Tempo is also assisting in preparation of Aluminum Mission Plan 2010-20, and evolving a model CSR action plan and its implementation methodology which can be applied across to Mining PSU’s in consultation with Federation of Mineral Industries (FIMI.)