

**Programme 5: Socio-Economic Partnerships**  
**Sub-programme: Science and Technology for Economic Impact**  
**Unit: Chemical Industry and Related Services**

**Description:** Chemical Industry and Related Services

**Purpose of the Unit:** Support research and development initiatives within the South African chemical industry

**List of Key Initiatives:** Fluorochemical Expansion Initiative

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**Fluorochemical Expansion Initiative**

**WHAT IS IT ABOUT?** : The fluorochemical expansion initiative is a priority project within government to develop the chemical sector in South Africa. This is done by promoting the increased beneficiation of fluorspar, a naturally occurring mineral of which South Africa possesses the 2<sup>nd</sup> largest reserves in the globe, behind China.

**WHAT IS IT TRYING TO ACHIEVE?** : It is hoped that the fluorochemical expansion initiative will result in the beneficiation of a wide range of downstream products for South Africa's abundant resources of fluorspar. The ultimate goal is the creation of fluorine-based new business ventures and firms that will support economic growth and development in South Africa. Earmarked chemical products include fluoropolymers, elastomers, pharmaceuticals and semiconductors.

**WHO IS THE IMPLEMENTING AGENCY?** : NECSA

**WHO'S RESPONSIBLE IN DST?** : Dr M J Mashimbye

**READ FURTHER:** The rollout of FEI has adopted a two prong approach: one being to facilitate the establishment of world class fluorochemical manufacturing plants and the other to expand the fluorochemical technology base to support the industry and to enable a steady stream of new products and technology to be exploited commercially in the future for South Africa.

## **IN THE PRESS:**

### **FLUOROCHEMICALS EXPANSION INITIATIVE (FEI)**

The Minister of Science and Technology, Mosibudi Mangena, launched the Fluorochemicals Expansion Initiative aimed at establishing value-adding fluorochemicals industries in the country at the Nuclear Energy Corporation of South Africa (NECSA) on 24 March 2009. The FEI, which would increase the local consumption of fluorspar and create more job opportunities, is being supported by the Department of Science and Technology (DST), as part of the Advanced Manufacturing Technology Strategy and the Department of Trade and Industry's (the dti) Chemical Sector Strategy.

### **Why fluorspar beneficiation?**

#### ***Government strategies***

The chemical sector is prioritized for growth and development of cutting edge industries in various government strategies. The DST-led *Advanced Manufacturing Technology Strategy (AMTS)* established chemicals as one of the priority thrust areas of the strategy. The DST/AMTS is not the only government strategy to prioritise the chemicals sector for development of cutting-edge industries. The *Accelerated and Shared Growth Initiative for South Africa (AsgiSA)*, a government initiative aimed at ensuring that economic growth is accelerated to an average of 6% between 2010 and 2014, has identified particular sectors of the economy – including chemicals and mining beneficiation – for accelerated growth. Fluorspar beneficiation was identified as a specific priority by the 2005 Chemical Sector Development Strategy of the Department of Trade and Industry (**the dti**). The FEI remains an important area of focus in the first Industrial Policy Action Plan (IPAP) of the 2007 National Industrial Policy Framework (NIPF). This was reinforced during the signing of the Chemical

Sector Summit Agreement in 2008. Also, the Department of Minerals and Energy launched a Minerals Beneficiation Strategy in 2009.

### ***Fluorspar reserves***

South Africa possesses the largest reserves of fluorspar (calcium fluoride, CaF<sub>2</sub>), a naturally occurring mineral which is the primary source of fluoride for all fluorochemicals, in the world. However, South Africa currently beneficiates less than 5% of its fluorspar exports into higher value fluorochemical products.

### ***DST's role in FEI***

The DST's mandate is to manage the National System of Innovation with regard to high-end skills and infrastructure development. The FEI is aimed at developing downstream products from our abundant natural resource fluorspar. The DST involvement is aimed at addressing science and engineering competencies, technology and infrastructure shortages in the fluorochemicals industry that is being established in the country.

Capacity and expertise in fluorochemicals in South Africa is largely concentrated within Pelchem (Pty) Ltd, the chemical division of NECSA. As a strategic national resource, the DST and **the dti** have previously supported the FEI by providing funds for skills retention, environmental impact assessment and research and development activities at Pelchem (Pty) Ltd. In addition, the DST facilitated the establishment of two fluorochemicals research chairs in the country. The two chairs are based at the Universities of Pretoria and KwaZulu Natal.

The DST, **the dti** and the Department of Minerals and Energy (DME) jointly serve on a FEI task team. It has been agreed that the DST would play the major role in supporting research and technology development and **the dti** would support business development activities.

### ***NECSA's expertise in fluorine research***

The state of South Africa's current fluorochemicals industry, excluding fluorspar exports, is largely a result of the country exiting its nuclear fuel programme in the 1990s and the subsequent commercialisation of the South African Nuclear Energy Corporation (NECSA's) hydrogen and fluorine plants at Pelindaba. The skills, capabilities and manufacturing facilities that resided at NECSA were seen as the catalyst for the implementation of FEI.

The manufacturing facilities together with the majority of the fluorochemical Intellectual Property (IP) were since 2007, corporatised into Pelchem (Pty) Ltd, a wholly owned subsidiary of NECSA. A key mandate for Pelchem is to support the FEI programme advanced by government. For security and retention of skills purposes, the R&D skills will reside under NECSA but with the commercial direction of Pelchem.

### ***FEI technology plan***

Over the last few years, the FEI has advanced significantly and conditions are now appropriate for building a significant research and development programme that will stimulate commercialisation opportunities in downstream beneficiation. The laboratories at Pelindaba, providing infrastructure and skills capacity to handle highly hazardous and toxic fluorochemicals, have recently been upgraded. In 2008 the DST approved a five-year FEI research proposal developed by Pelchem (Pty) Ltd, working in close partnership with the two South African Research Chairs at UP and UKZN and based on a detailed analysis of the fluorochemicals sector internationally and potential market opportunities.

Pelchem (Pty) Ltd will be pursuing research activities for downstream products such as fluoropolymers, refrigerants, specialty gases, and performance fluids. The FEI technology plan intends on increasing the capacity base and depth of fluorochemical technology through engaging in intensive and specific R&D projects which are expected to result in a pipeline of novel and viable commercial

opportunities to support the development of a world class fluorochemical industry in South Africa. Expected benefits for the country includes amongst others the following:

- Increased exports and an improvement on chemical trade deficit e.g. export of high value fluorochemicals such as refrigerants, fluoropolymers, specialty gases and performance fluids.
- Stimulate the use of HF and Fluorine in other mineral beneficiation initiatives e.g. production of Ti, Zr, Hf, Ta and Nb metals.
- Foreign direct investments and international collaborations in business and technology.
- Growth and development of high level skills and technology – increase number of fluorochemical patents registered by SA participants.
- Increase the beneficiation of key raw materials and minerals. For example fluorspar currently at (1US cent) per kg would be converted to various fluorochemical products that sell from \$5 to over \$100 per kg.
- Create skilled and semi skilled jobs with opportunities to establish various support industries and downstream businesses.
- Secure source of key raw materials and skills for the country for potential strategic programs e.g. securing HF and fluorine for the nuclear fuel cycle.

The Minister of Science and Technology, Mosibudi Mangena, launched the Fluorochemicals Expansion Initiative at NECSA on 24 March 2009. It is envisaged that the work programme will be consolidated under the framework structure of a Centre of Competence funded by the Technology Innovation Agency (TIA) once TIA is operational and the activity/contract with Pelchem is migrated. (#153586)

<http://www.dst.gov.za/media-room/speeches/address-by-minister-mosibudi-mangena-at-the-launch-of-the-fluorochemical-expansion-initiative>

<http://www.engineeringnews.co.za/article/necsa-launches-fluorochemical-expansion-initiative-2009-03-24>