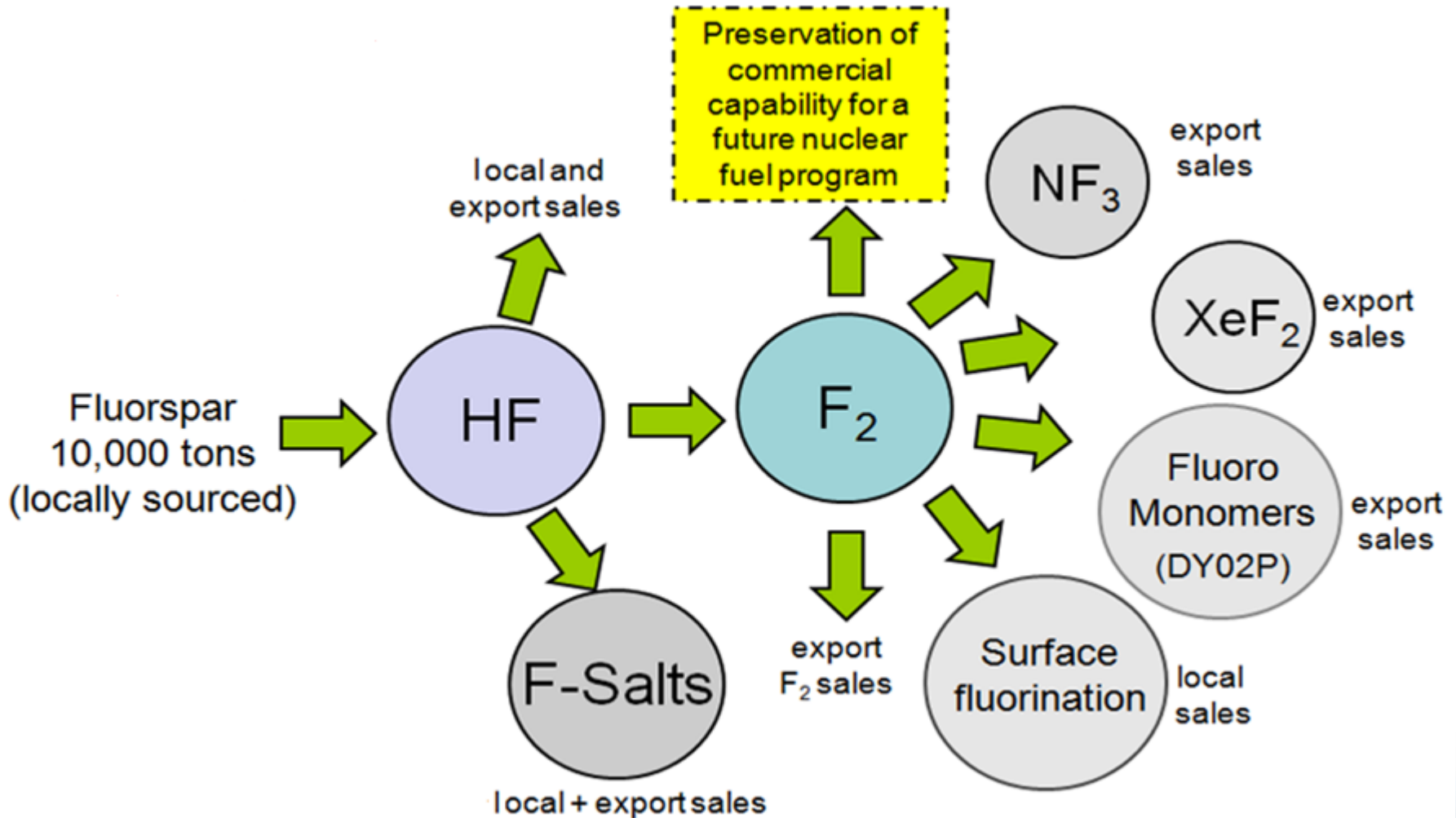


Pelchem SOC Ltd Overview February 2014

Pelchem SOC Ltd

- Subsidiary of the South African Nuclear Energy Corporation (Necsa)
- Registered as a state owned company (SOC)
- Governed by independent Board of Directors
- Proud record of more than 27 years experience in locally produced fluorspar beneficiation
- Operates and maintain a portfolio of fluorochemical products in the local and international markets
- Plays a leading role in the SA Fluorochemical Expansion Initiative (FEI)
- Ability and knowledge base to diversify, expand and develop Fluorine products across multiple market sectors

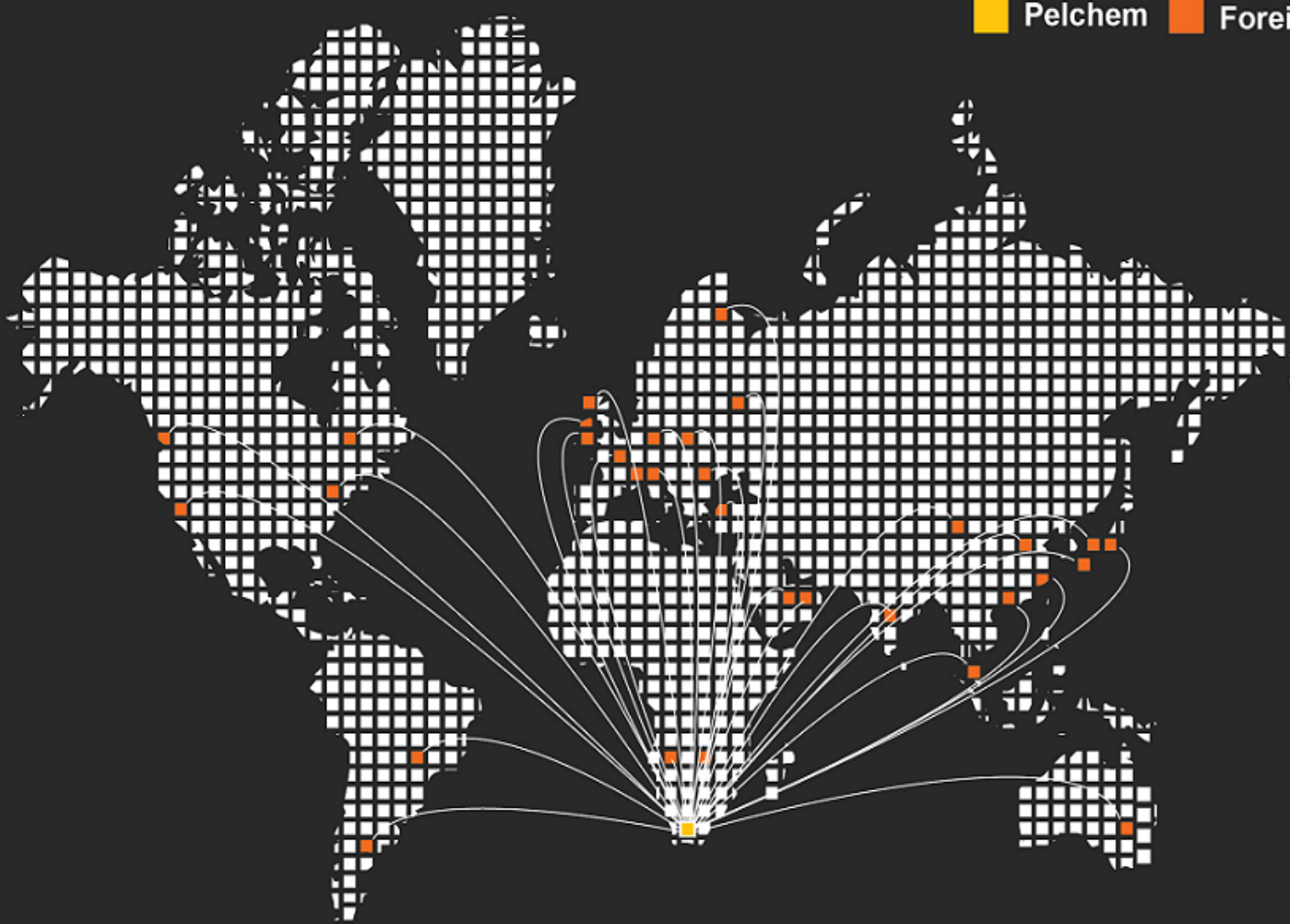
Pelchem Today



Pelchem: We're in your world:

25 products delivered to 27 Countries on 6 Continents

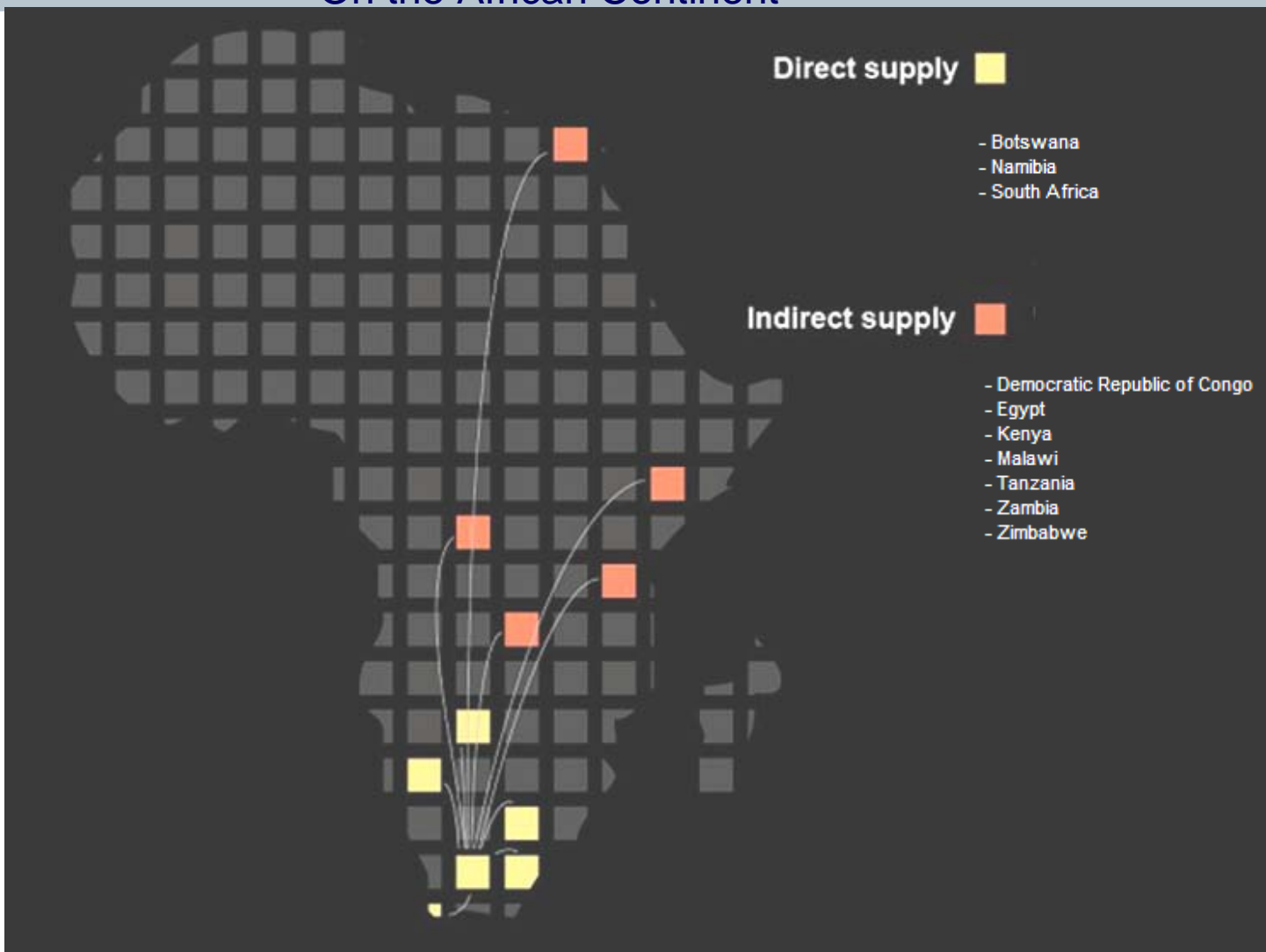
■ Pelchem ■ Foreign Market



- Argentina
- Australia
- Austria
- Brazil
- Canada
- China
- Czech Republic
- Dubai
- England
- Finland
- France
- Hong Kong
- Germany
- India
- Ireland
- Japan
- Portugal
- Romania
- Russia
- Saudi Arabia
- Scotland
- Singapore
- South Korea
- Switzerland
- Taiwan
- Turkey
- USA

Pelchem: We're in your world

On the African Continent

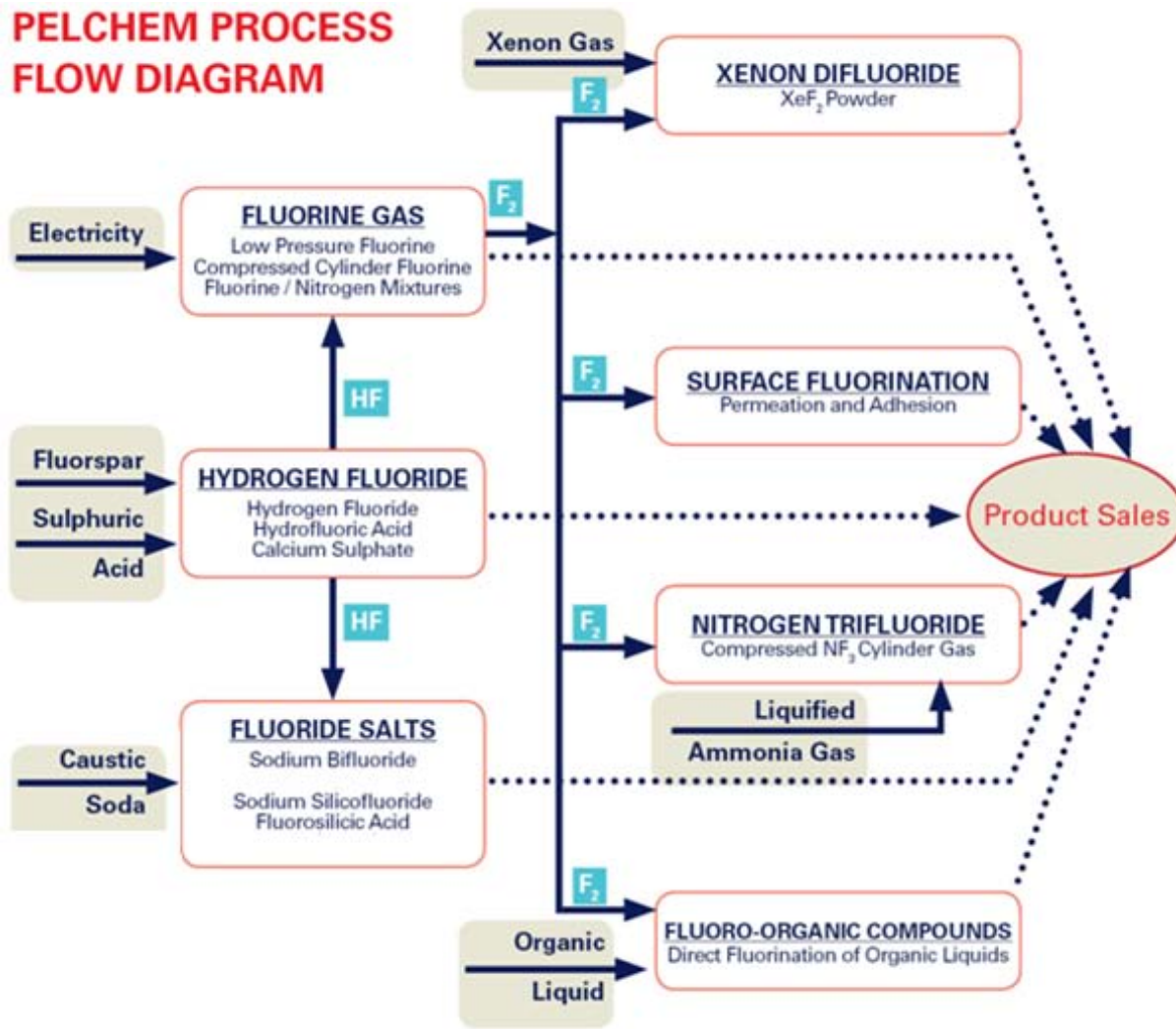


Production capabilities

- Currently eight commercially operated production facilities, delivering twenty five products and services to the local and international commodity and speciality gas markets
- Most production facilities are operated under patented, trade secret or trade mark protection
- Unique know-how across the Pelchem product value chain is a competitive advantage

Processes

PELCHEM PROCESS FLOW DIAGRAM



Hydrofluoric acid plant

Hydrofluoric Acid Production

Reagents: Sulphuric acid, fluorspar ore

Products: Anhydrous hydrogen fluoride, hydrofluoric acid

Markets: Petroleum alkylation, stainless steel, mining, industrial chemicals



Fluoride Salts plant

Fluoride Salts Production

Reagents: Caustic soda solution, hydrogen fluoride

Products: Sodium bifluoride, sodium silico fluoride, Fluorosilicic acid

Markets: Metallurgical tin plate, soldering fluxes, water fluoridation



Fluorine gas (F₂) plant

Fluorine Gas Production

Reagents: Potassium bifluoride, hydrogen fluoride, electricity

Products: Fluorine gas on line, compressed fluorine cylinders, fluorine & nitrogen gas mixtures

Markets: Pharmaceutical, laser gas mixtures, semiconductor gases, plastic surface fluorination



Nitrogen fluoride (NF_3) plant

Nitrogen Trifluoride Production

Reagents: Ammonium bifluoride, ammonia gas, fluorine gas

Products: Nitrogen trifluoride

Markets: Semiconductor, LCD screens, electronics, solar energy panels



Fluoro organics plant

Fluoro Organic Compound Production

Reagents: Organic intermediates, fluorine gas

Products: Fluoro organic monomer

Markets: Low temperature fluoro-elastomer to automotive and space industry



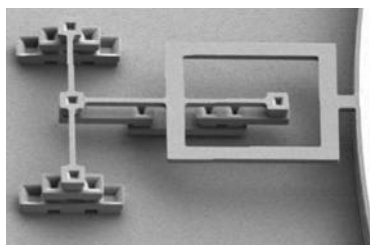
Xenon difluoride (XeF_2) plant

Xenon Difluoride Production

Reagents: Xenon gas, fluorine gas

Products: Xenondifluoride

Markets: MEMS, display panels, consumer electronics



Surface fluorination plant

Fluoro Pack™

Reagents: Fluorine gas, various polymer products

Products: Fluorinated polymer products with reduced permeation, improved chemical resistance and adhesion characteristics

Markets: Automotive fuel tanks, chemical and agrochemical packaging, underground polymer fuel pipes and painted polymer parts



Multipurpose fluorination pilot facility

MFPP established for:

- Production of commercial scale (10's of kgs) samples of a wide variety of fluorochemical products for product development and market penetration and qualification
- Generate process parameters, engineering data and costing information for scale-up to commercial plants
- R&D in terms of testing and verification of new innovative processes and design ideas developed in the laboratory
- Training of operators, technicians, scientists and engineers
- Manufacturing various products, i.e. Perfluoroheptane (PFH), perfluoroalkane (PFA), metal fluorides (MoF_6), fluoropolymers (PVDF), etc

Phases of MFPP

- ❑ Facility 1 - Direct fluorination of organic compounds
- ❑ Facility 2 - Polymerization of fluoromonomers
- ❑ Facility 3 - Fluorination of a variety of inorganic compounds
- ❑ Facility 4 - Partial fluorination of organic compounds



Polymerization reactor and initiator feed system showing dosing pump



Storage vessels of DF reaction system with utility headers in the background

Intellectual property (IP)

Pelchem IP portfolio:

- Trademarks
 - Pelchem,
 - Fluoro Pack,
 - SF₂P (Surface Fluorination)
- Trade secrets
 - Fluorine manufacturing technology
 - XeF₂ production process and plant design
 - WF₆ production process and plant design
 - Organic Fluorides production process
 - Surface Fluorination process technology

Intellectual property continue

- Patents:
 - 10 families (general descriptions)
 - TFE plasma technology
 - Surface Fluorination – Surface Fluorination oxyfluorination
 - Barrier – Surface Fluorination barrier technology
 - Glass Fibre Wrapping – Surface Fluorination adhesion technology
 - Cladding – Surface Fluorination adhesion technology
 - Vapour Enhanced Oxyfluorination
 - Direct Liquid Fluorination
 - Conversion of Liquid FC-containing materials to useful products No 1
 - Conversion of Solid FC-containing materials to useful products No 2
 - NF_3 production process

Commercial successes

- 1976: Fluorine plant design, build and commissioned – only one in Southern Hemisphere
- 1984: HF plant – built and commissioned
- 1988: Fluoride salts production – Na_2SiF_6 & NaF.HF
- 1991: Surface fluorination technology – patented
- 1995: Large scale HF semi-automatic dilution and drumming plant commissioned
- 1997: Commercial scale fluorine plant built
- 2000: Direct fluorination plant – patented process
- 2002: Fluorochemical monomer – proprietary process
- 2003: NF_3 200 ton/a plant developed, designed and built
- 2008: XeF_2 – world's first commercial plant
- 2014: MFPP – 4 phases completed – MoF_6 commercial product

Human capital

- 171 staff members (specialized)
- 33% professional staff
- Top Management average work experience > 21 years
- Industrial Relations:
 - No Industrial action the last 5 years, labor and management share a common value system
 - Three (3) recognized trade unions
- R&D outsourced to Necsa Applied Chemistry Department

Pelchem family

pelchem family values



Training

- Accreditation as employer of apprentices by the CHIETA
- % Training spent as a % of Total Salary Bill > 2.4%



Employee Assistance Program (EAP)

- The EAP follows the principles of Work-Life Balance by providing skills to improve employee wellness and strive to achieve a healthy balance among Physical, Emotional, Social and Spiritual dimensions
- The EAP has the following services to employees: Psychotherapy and other therapies for employees and families, Wellness Day and wellness programs, HIV-AIDS program, Recognition system, Induction program for new employees, Food scheme, Clothes scheme, Budget planning, Mentorship Program, et.

Corporate Social Investment (CSI)

- Pelchem has chosen Meerhof School for disabled learners as CSI responsibility.
- The services to Meerhof School include: Casual Day support, Go Green Initiative, School Calendar, Healthy Hearts Industrial Theatre, Support to mouth painter to attend the Annual Art Exhibition of Mouth Painters, Educational support, “Thisability” (the newspaper for the Disabled), Supporting 80 Art learners.

Thatofatso Segapo (Mouth painter)



Necsa R&D capabilities

Fluorine chemistry:

- World class expertise (> 50 scientists and engineers)

Chemical analytical capabilities:

- Instrumental methods for analysis of compounds, e.g. GC, GC-MS, HPLC, FTIR
- Elemental analysis, e.g. AAS, ICP-OES, ICP-MS, XRF, Plasma MS, TI-MS Ion Chromatography, Leco
- Wet chemical techniques
- Air sampling and monitoring
- ISO 17025 accreditation

Commitment to SHEQ



SAFETY CULTURE CAMPAIGN

'BE THE CHANGE! SAFETY IS FOR ALL'

Vision

To establish a safety culture where all employees at all levels in the organisation are empowered to discuss issues threatening the safety mission of Pelchem openly and with the interest of all Pelchem people at heart with no fear of negative consequences.

Mission

- We will strive for ZERO harm to our employees by taking a pro-active approach to prevention of injuries.
- We subscribe to the principle 'In safety all employees are equal', all employees are empowered to challenge unsafe acts and conditions.
- We will lead by example around the issues of Safety, we will practice what we preach.
- We will ensure that Safety becomes the overriding principle for all our business decisions.
- We will encourage shared learning and open communication around Safety at all levels throughout the organisation.
- We will set up energising systems and structures to support the development of a world class safety culture.
- We will persistently focus on the organisation's Safety results to drive continuous improvement of our Safety system.
- We will support our BBS program by ensuring elimination of unsafe conditions and providing timely feedback on identified Safety barriers.
- We will ensure continuous and on-going learning around the issues of Safety.
- We will drive excellence in production and customer care within the safety values we honour.

Values

- Safety is the currency of caring about our people, our suppliers and our customers: the Pelchem business!

APS Terblanche

Managing Director

PCM-SHE-GNN-11001 Rev 1



Accreditation



CERTIFICATE OF ACCREDITATION

In terms of section 22(2)(b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

**NECSA
PELINDABA ANALYTICAL LABORATORIES**
Co. reg no: 2000/003735/06

Facility Accreditation Number: T0168

is a South African National Accreditation System accredited Testing laboratory provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for

CHEMICAL AND ENVIRONMENTAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2005

The accreditation demonstrates technical competency for a defined scope and the operation of a laboratory quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant SANAS accreditation symbol to issue facility reports and/or certificates

Mr R Joshi
Acting Chief Executive Officer

Certificate Commences: 31 December 2009
Certificate Expires: 31 December 2014

CHEMICAL AND ALLIED INDUSTRIES' ASSOCIATION



Responsible Care Award

Pelchem (Pty) Ltd

*Winner
2009*


FRANK BAKER
CHAIRMAN


LAURRAINE LOTTER
EXECUTIVE DIRECTOR

Membership



Pelchem

*Combining more than 27 years of successful production,
distribution and sales of fluorochemicals,
with superior quality,
an impeccable safety record,
excellence in customer care,
in a globally expanding fluorochemical market,*

Pelchem SOC Ltd

Presents a proudly South African footprint.

Pelchem is located on the Necsa Eco-Industrial Park
North West Province, South Africa

