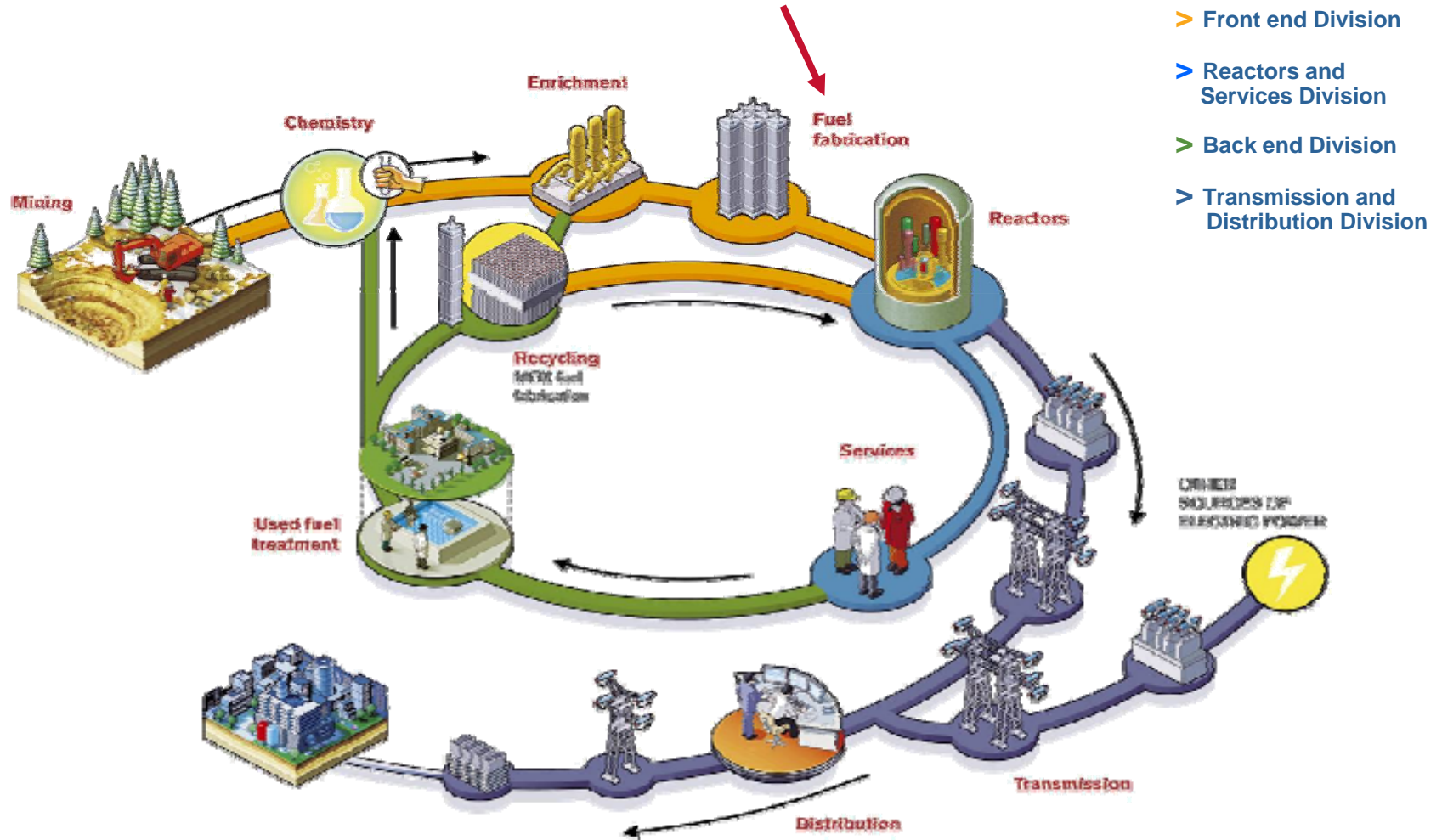


# NECSA - AREVA CERCA: the road to conversion

## Energy, AREVA's core business

*Cerca: a subsidiary of Areva*



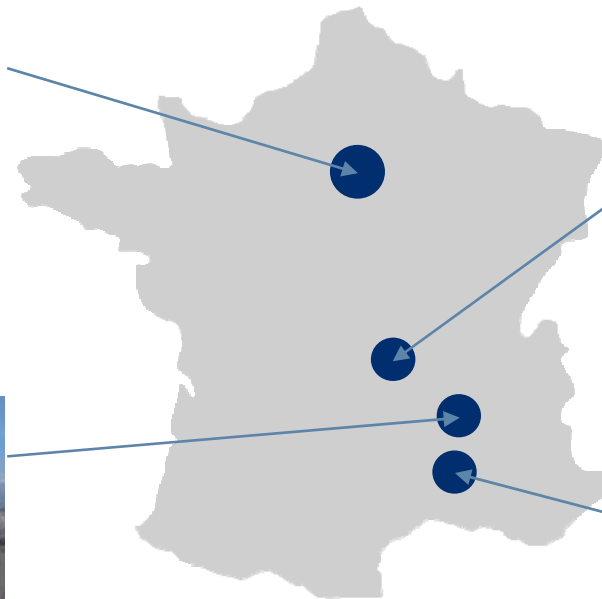
# NECSA - AREVA CERCA: the road to conversion

## Cerca's overall experience

**CERCA: world leader in manufacturing of Research and Test Reactor fuel assemblies**



**PARIS**  
Head Office



**LYON**  
Main office



**ROMANS**  
Main Plant

- Production capacity: 20 000 fuel plates
- Annual production: 10 000 fuel plates



**PIERRELATTE**  
LEA  
Standard radioactive sources

### Cerca experience

Since 1960

- Over 300 000 fuel plates
- About 20 000 fuel elements of 70 designs
- Delivered to 40 research reactors
- In 20 countries

## NECSA - AREVA CERCA: the road to conversion CERCA's experience in Silicide Fuel

CERCA has been working for more than 20 years on the development of silicide fuel and now manufactures on an industrial scale and routinely delivers worldwide this type of fuel.

### Cerca U<sub>3</sub>Si<sub>2</sub> customers



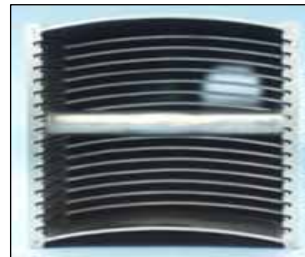
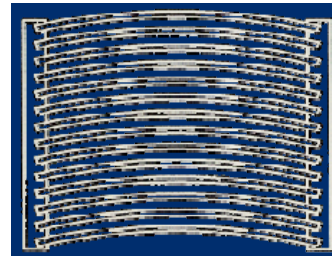
- Total supply as of beginning 2007: 3 000 U<sub>3</sub>Si<sub>2</sub> fuel assemblies
- Annual production of 5 000 U<sub>3</sub>Si<sub>2</sub> fuel plates

## Main designs manufactured by CERCA

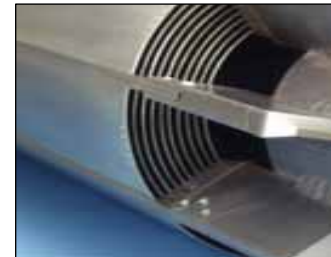
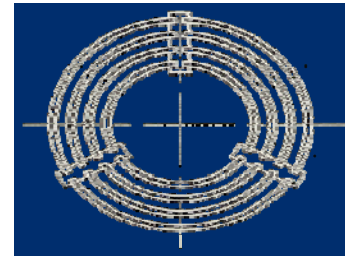
**FLAT PLATES**



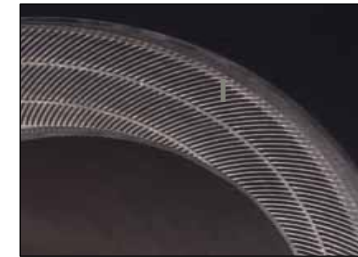
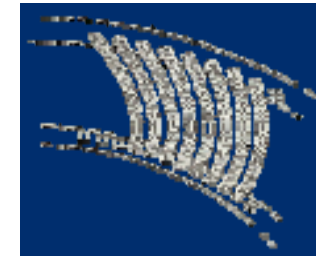
**CURVED PLATES**



**TUBULAR**



**RING-SHAPED**



## ***NECSA - AREVA CERCA: the road to conversion CERCA's experience in Silicide fuel***

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### **► Mastering of manufacturing processes through:**

- ◆ Implementation of new production equipment and processes to fulfill specific silicide fuel requirements
- ◆ Extensive program of test and development covering design parameters and production parameters
- ◆ Meeting of a constant objective: reliability and safety

### **► Experience in Research Reactor Conversion**

- ◆ International cooperation from more than 15 years for MTR and TRIGA reactor conversion (Japan, Germany, France, the Netherlands, the US ...) and the last one:  
**RPI reactor in Portugal**

## **NECSA - AREVA CERCA: the road to conversion** **NECSA – CERCA: a long-lasting partnership**

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- ▶ **Memorandum Of Understanding signed in early 2004** with several scopes of joint work
- ▶ **Supply of LEU fuel** (two LTAs in 2005 and Silicide Fuel plates in 2006 & 2007)
- ▶ **Agreement between NECSA and CERCA for a two-step technical cooperation:**
  - ◆ **Phase 1a: Short Term Technical Assistance (2007)**
    - Review of the manufacturing process (experimental scale)
    - Review of the first LTAs manufactured by Necsa
  - ◆ **Phase 1b: Longer Term Co-operation Agreement (2008)**
    - Full evaluation of equipment and processes (production scale)
    - Training of Necsa staff in France (CERCA plant, Romans)
    - Technical assistance during start up of new equipment in South Africa
    - Validation of first production run manufactured by MTR Fuel

- ▶ First step completed in February 2007
  - ◆ Evaluation of Necsa processes and practices,
  - ◆ Proposal for improvements,
  - ◆ Implementation of corrective actions initiated
  - ◆ Manufacture of the first demonstration fuel plates
  
- ▶ Lessons learned
  - ◆ Significant transition from experimental (mini) plate manufacture to full sized plates for LTA application (“experimental vs production gap”)
  - ◆ Critical manufacturing challenges to be overcome, requiring a complete change in mind-set
  - ◆ Communication/interaction with an experienced manufacturer shortens the learning curve dramatically !

South Africa has committed itself to the conversion of the SAFARI-1 reactor and the associated Fuel Manufacturing Facility from HEU to LEU:

- ▶ **Current status:** on-going fuel test programs on an experimental scale
- ▶ **Future steps:** achieve qualified licensed fuel on an experimental scale, then on a production scale through the cooperation with CERCA
- ▶ Mutual benefits for the two companies are expected:
  - ◆ Strengthening of the relationships
  - ◆ Development of skills and competences in the fuel manufacturing field at NECSA and in South-Africa
  - ◆ Routine production of silicide fuel in South Africa
  - ◆ Significant milestone in the continuing AREVA – SOUTH AFRICA partnership
  - ◆ Gain of new experience in reactor conversion for CERCA

**And Participation to the GRTRI program**

