The FABRICE process in LECA

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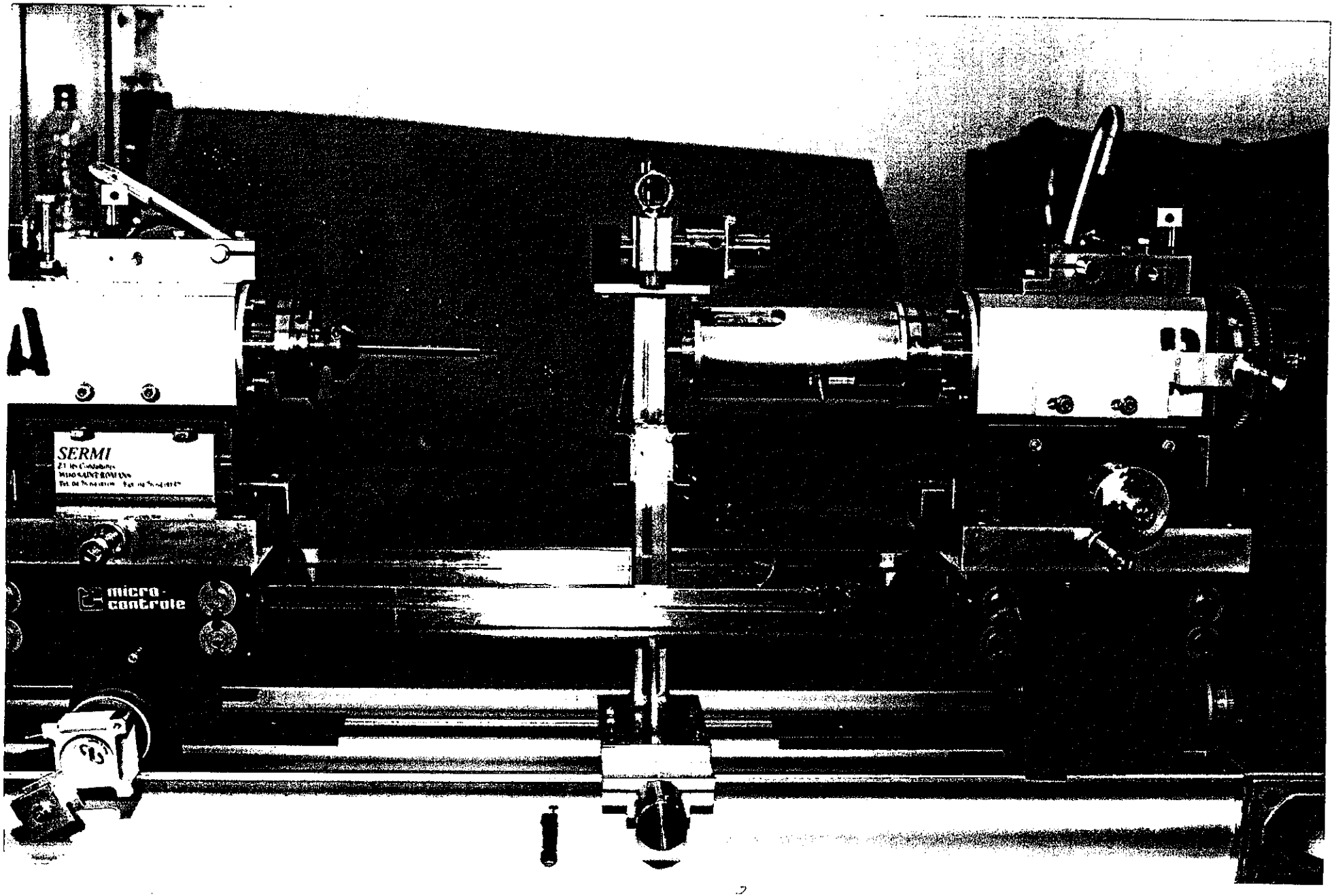
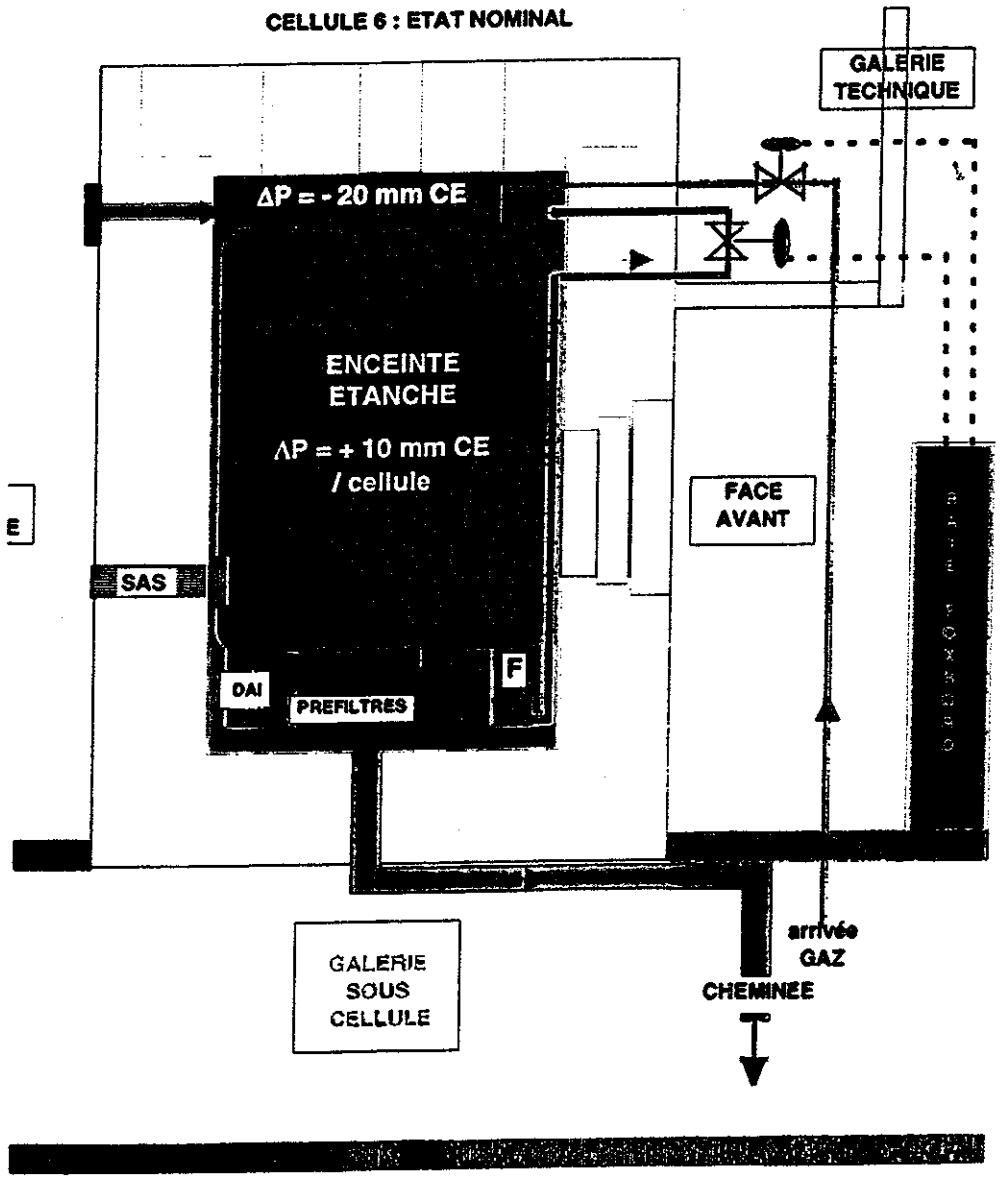
G.M.DECROIX

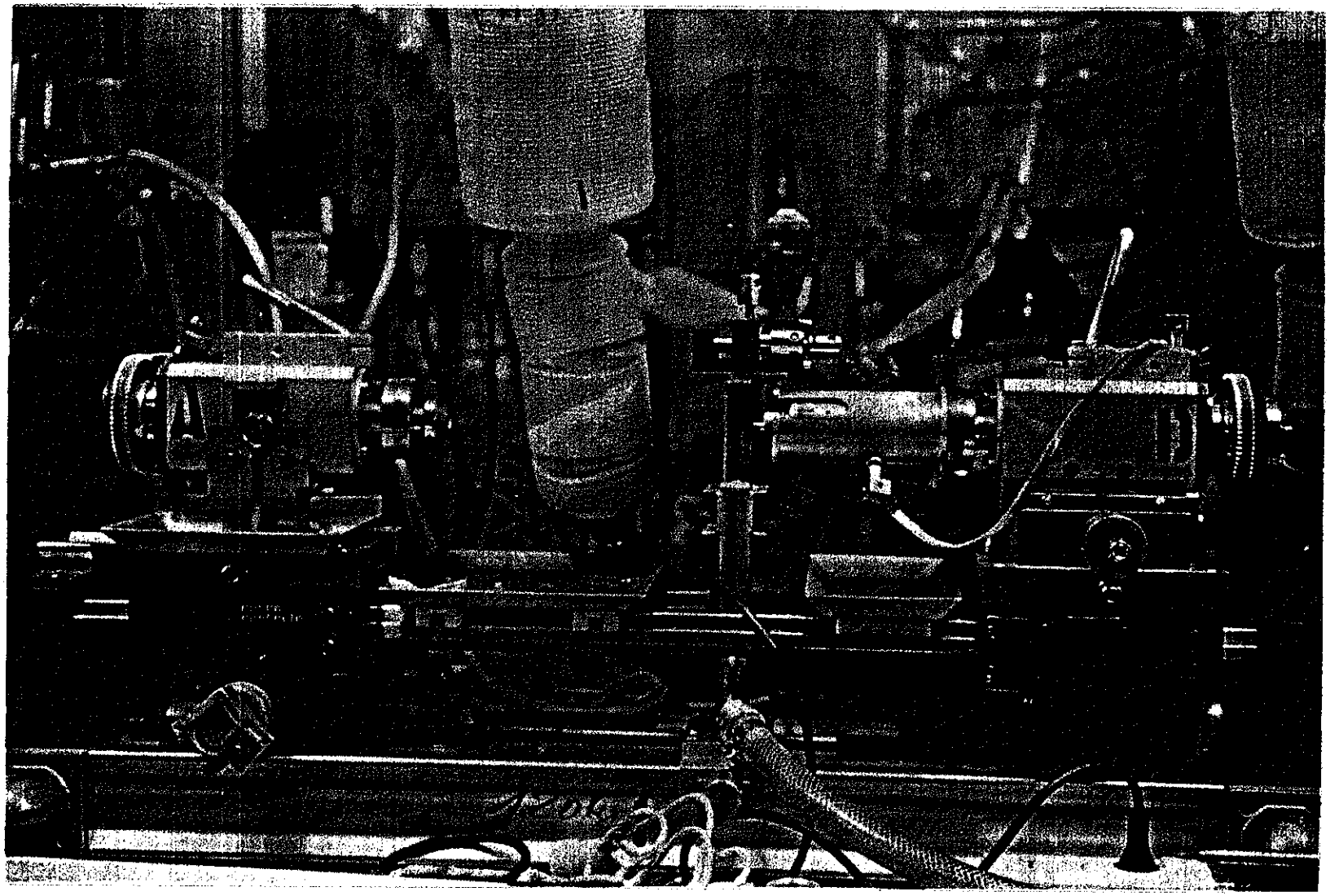
EWG "ML & RM"
Karlsruhe 6a. 13-15, 1979


SERMI
micro-contrôle

CELLULE 6 [SCHEMA DE PRINCIPE DE LA REGULATION]

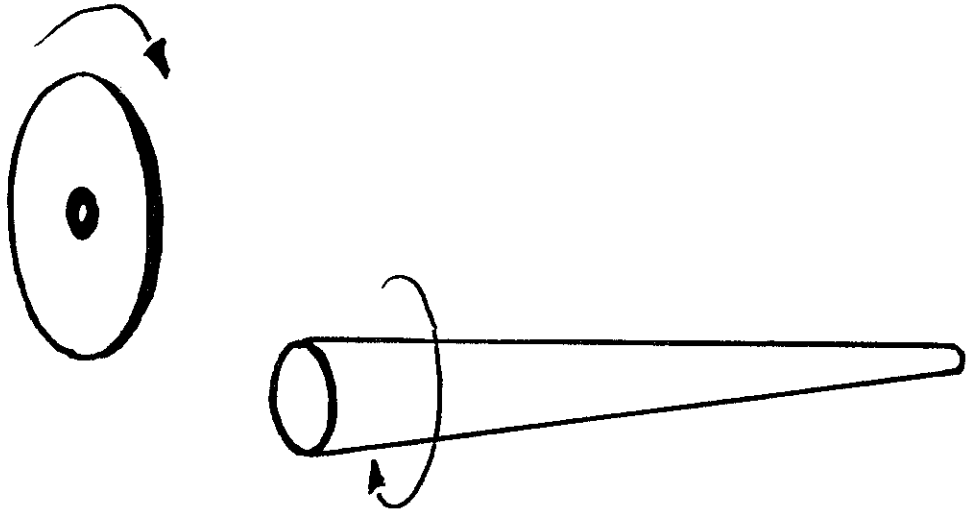


ΔP = - 20 mm CE / à la zone avant	volume en air de la cellule
ΔP = + 10 mm CE / à la cellule	volume de l'enceinte inerte



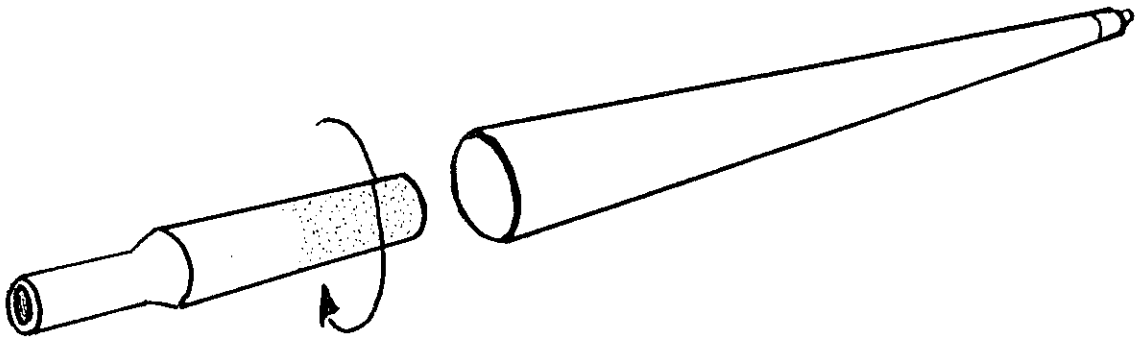
THE FABRICE PROCESS

- **Cutting and facing the lower end**



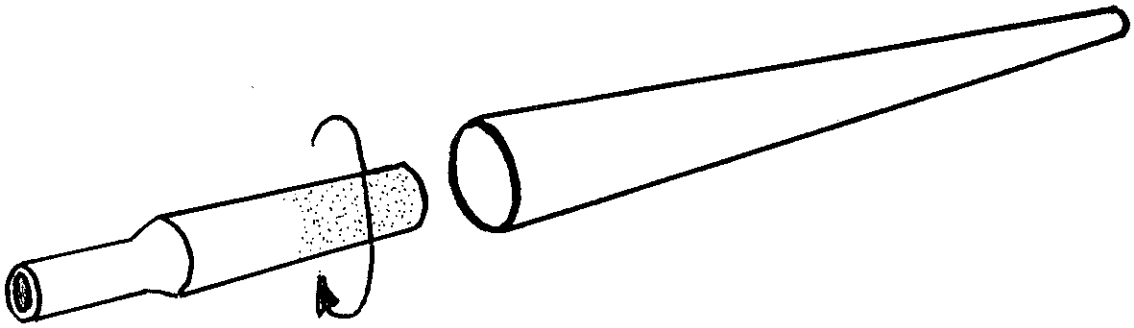
THE FABRICE PROCESS

- UO2 extraction over around 50 mm



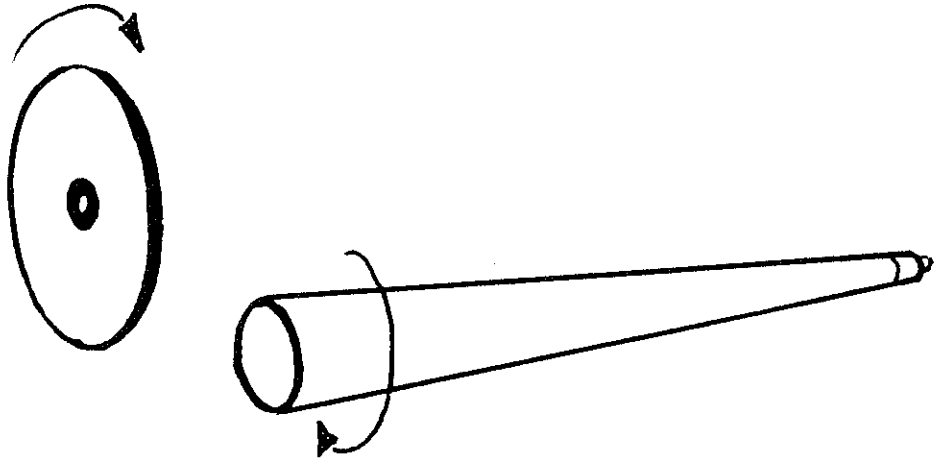
THE FABRICE PROCESS

- **UO2 extraction over around 10 mm**



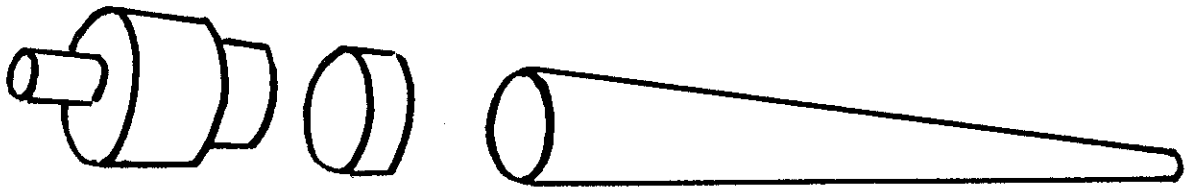
THE FABRICE PROCESS

- **Cutting and facing the upper end**



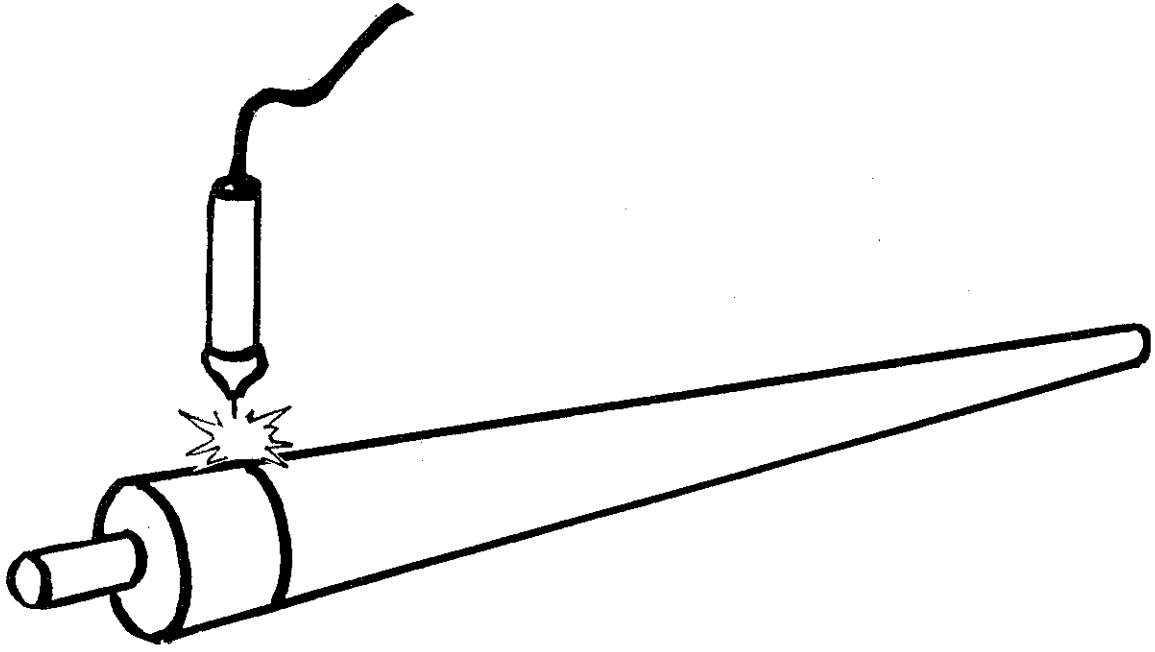
THE FABRICE PROCESS

- **Insertion of insulating pellet and plug**



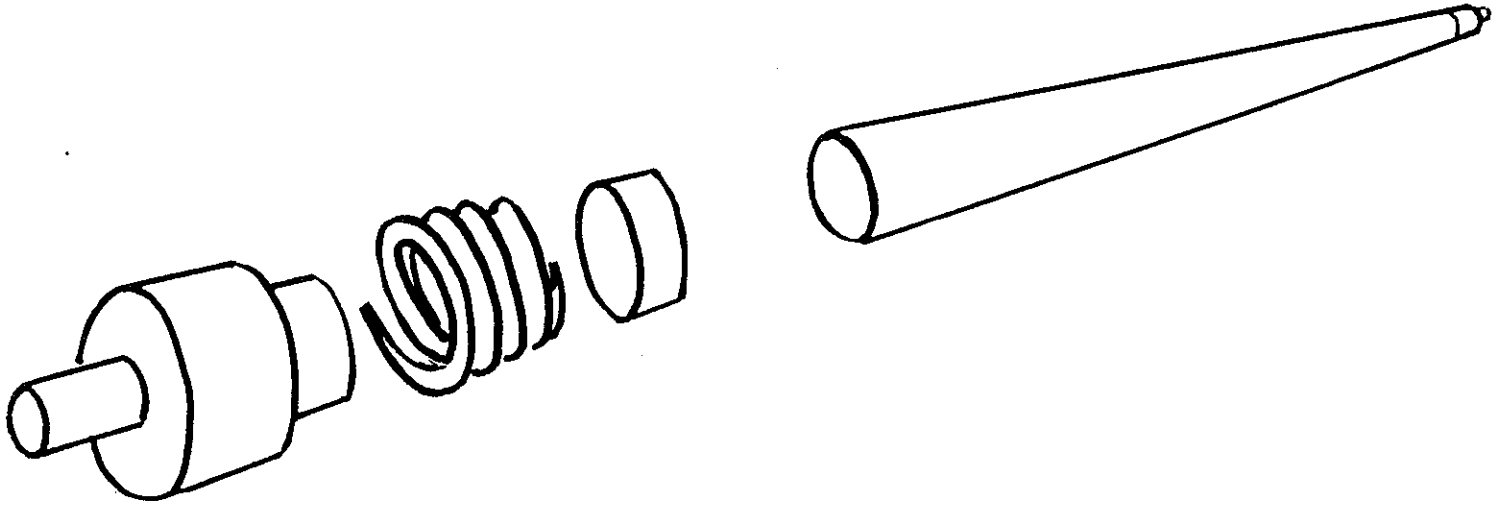
THE FABRICE PROCESS

- **Lower plug welding**



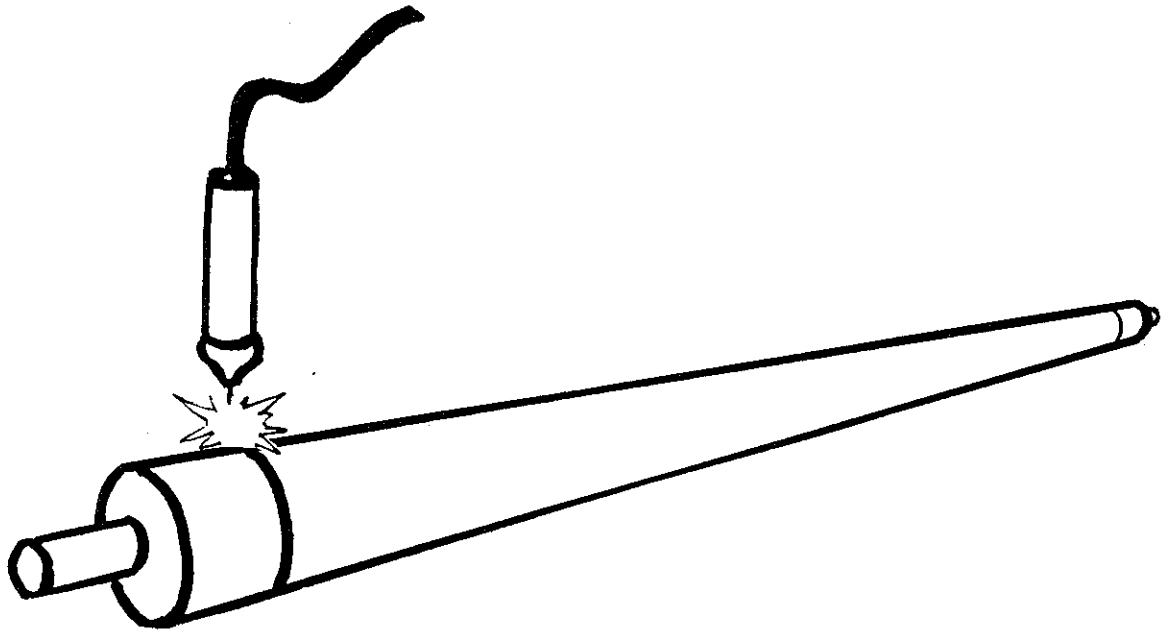
THE FABRICE PROCESS

- Insertion of insulating pellet, spring and upper plug



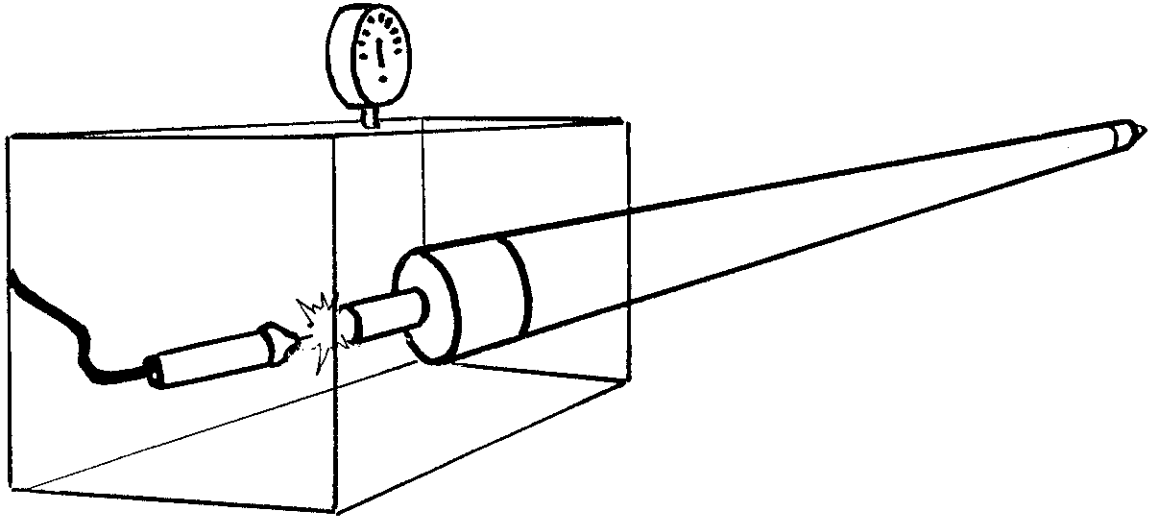
THE FABRICE PROCESS

- **Upper plug welding**

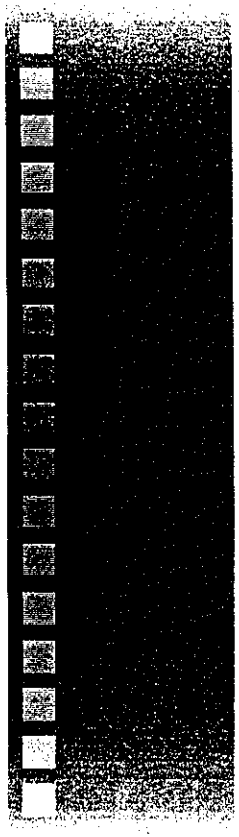


THE FABRICE PROCESS

- **Pressurization and seal welding**

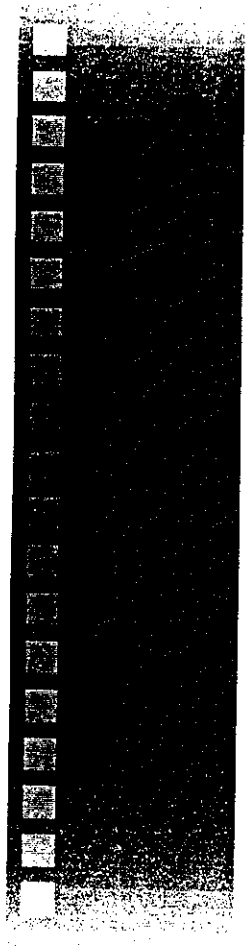


CHRONOLOGICAL REVIEW



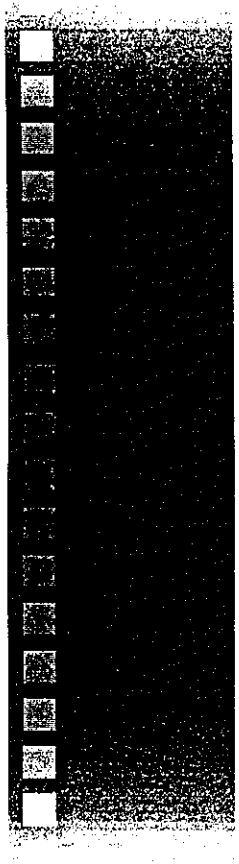
- mid 95 — Choice of the hot cell
- mid 95 — Request for proposals
- 2nd half of 95 — Design and fabrication
- beginning 96 — Acceptance of the devices
- 97 - 98 — Reconditionning of the hot cell
  - Dismantling, decontamination, modifications
  - Changing the shielding window
- 99 — Qualification of the welding process and Start up in hot cell

GENESIS OF THE FABRICE PROCESS



- End of the 70 ies : conception of the process in LECI laboratory in SACLAY
- Around 100 short rods manufactured up to now in SACLAY
- Oct 94 : Decision to transfer in LECA laboratory in CADARACHE

THE FABRICE PROCESS

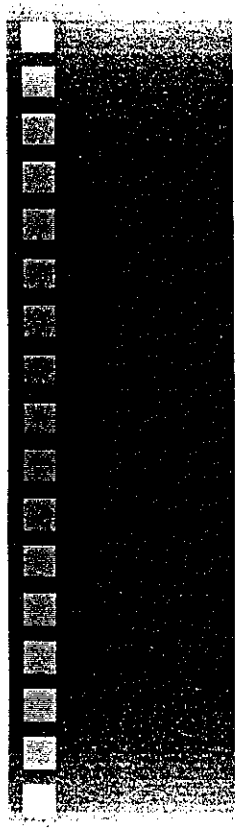


- **Non Destructive examinations of the selected rod**
  - Visual
  - Metrology
  - Eddy Current
  - X-Rays
  - Gamma Spectrometry

THE FABRICE PROCESS

- **Non Destructive examinations of the FABRICE rod**
  - Visual
  - Tightness
  - X-Rays
  - Metrology
  - Eddy Current
  - Gamma spectrometry
  - Check of surface contamination

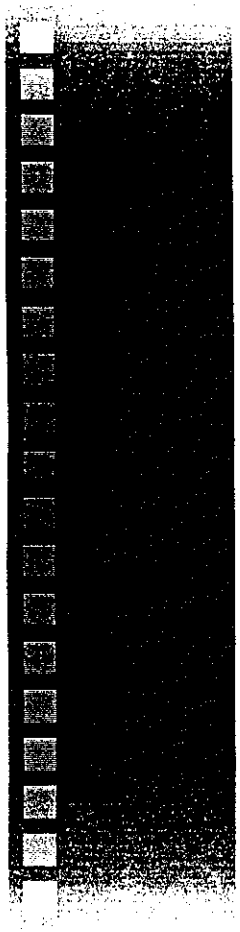
Main difficulties encountered



Tightness of the hot cell inner housing

- Old and contaminated hot cell
- Submited to partial (but sometime destructive) dismantling and renovation
- Difficult to Impossible access
-
-
- **Finally impossible to make it gastight**

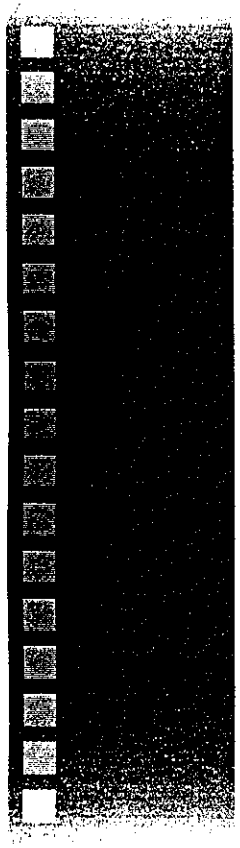
Main difficulties encountered



Additional problems from COLD to HOT environment

- Electrical control :
  - OK before security inspection
  - does not work after
- Welding :
  - non acceptable welding electrical ground
- Seal wealding device :
  - tight in cold environment
  - leakage in hot environment

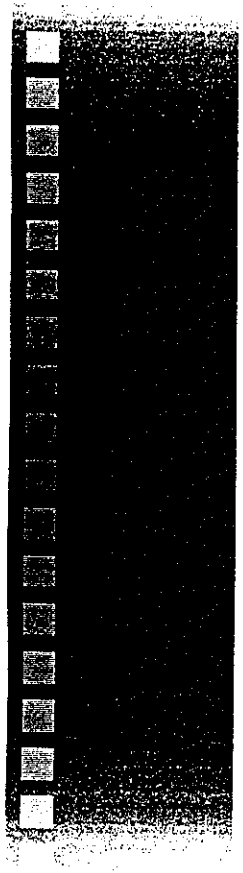
Main difficulties encountered



Malfunctions

- Destructive malfunctions due to action of welding High Frequency current on the electrical control device
- Failure of periscopic device electrical control
- Malfunctions of heavy remote manipulator
- Failure of Helium leakage test device

Main difficulties encountered

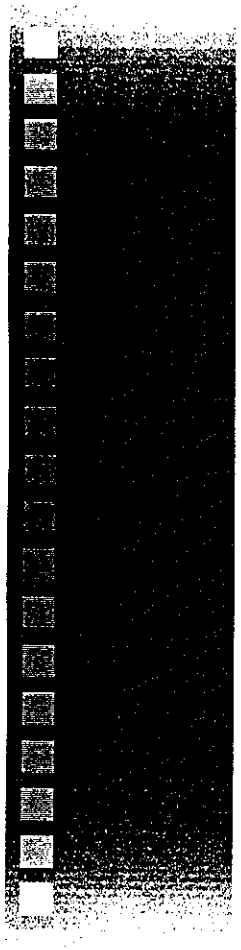


Heavy human manual operations

- Around 50 human operations in the hot cell
  - access lock
  - security devices (i.e in case of faint feeling of human operator)
  - radiological survey

LESSONS LEARNT

- The preparation work was **not carried out continuously**
- It has been **a long time project**
  - Human organisation changed
  - Responsability moved and sometimes was not clear
- **Strong interferences** with :
  - the Nuclear Installation operations
  - the experimental programmes



LESSONS LEARNT

Even if it concerns only one hot cell

Such a work must be organized in a

Project Structure

which manages the Priorities

and makes the Choices