



énergie atomique • énergies alternatives

Dismantling the fissile materials production plants for nuclear weapons and the nuclear testing site: a french experience

Mr François BUGAUT
Head of Strategic Nuclear Materials Division
CEA (France)



French commitment



énergie atomique • énergies alternatives



« Resolving to seek a safer world for all and to create the conditions for a world without nuclear weapons, in accordance with the goals of the NPT, in a way that promotes international stability, and based on the principle of undiminished security for all. »

UNSCR Resolution 1887 (September, 2009)

French decisions (1)



énergie atomique • énergies alternatives

First decision: definitive ban on nuclear tests

- 1996: Definitive cessation of nuclear testing
 Signature of the CTBT
 Decision to dismantle the sites & beginning of work
- 1998: Ratification of CTBT



France, the first NWS with UK to have signed and ratified the CTBT



France, the only NWS to have shut down and dismantled irreversibly its nuclear testing sites

French decisions (2)

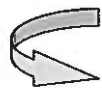


énergie atomique • énergies alternatives

Second decision: cessation of the production of fissile materials for nuclear weapons

1992: Cessation of production of plutonium

1996: Cessation of production of highly enriched uranium
Moratorium on the production of these materials
Decision to dismantle the dedicated facilities



*France, the only NWS to have shut down and dismantled irreversibly
its facilities for production of fissile material for nuclear weapons*

French nuclear test site



Mururoa

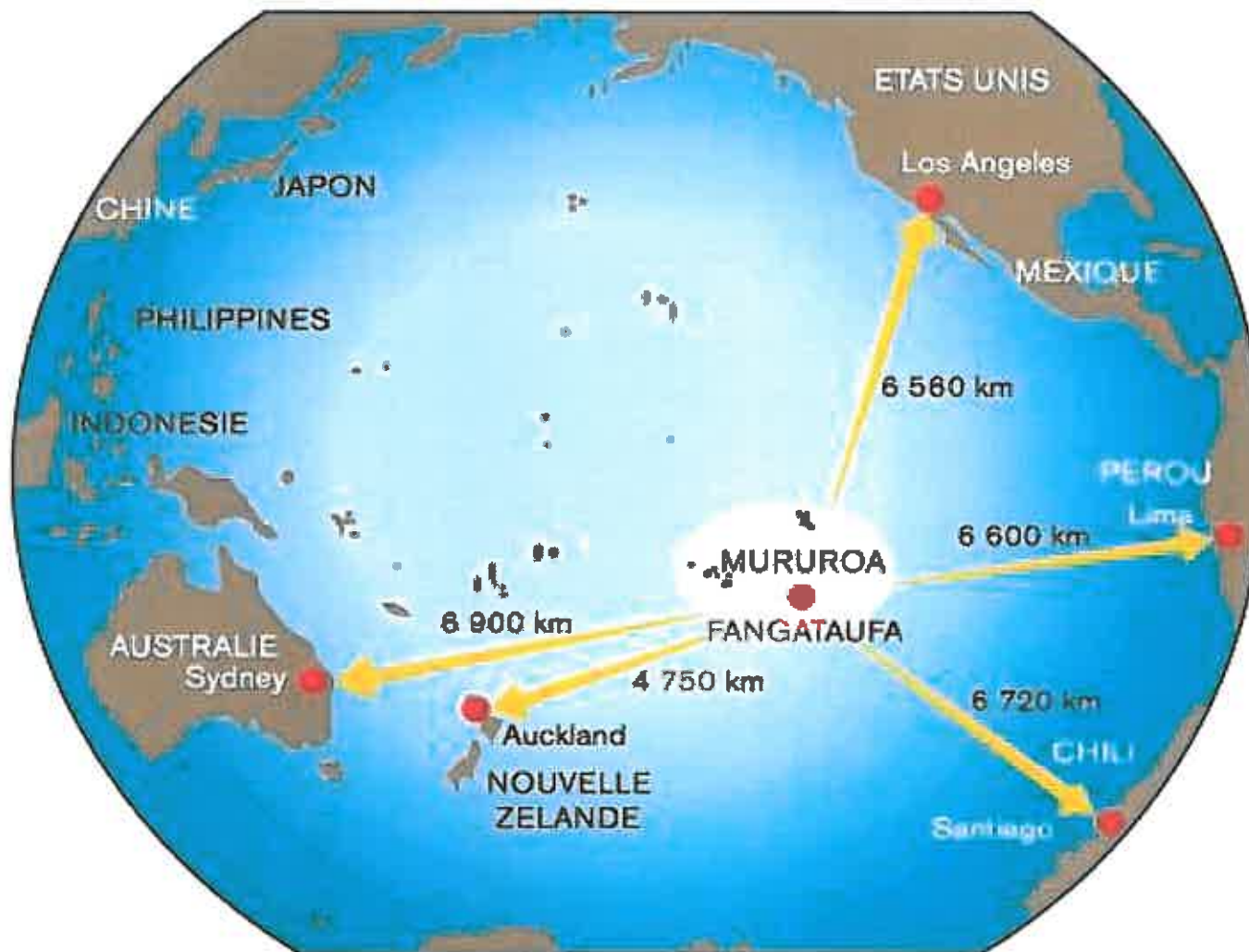


Fangataufa

Mururoa and Fangataufa atolls in South Pacific



énergie atomique • énergies alternatives



Nuclear tests



énergie atomique - énergies alternatives

1966 – 1974	41 atmospheric tests
1974 – 1996	152 underground tests
Total	193 nuclear tests



Buildings & infrastructures

cea

énergie atomique • énergies alternatives



Dismantling operations



énergie atomique • énergies alternatives



Before & after dismantling



énergie atomique • énergies alternatives



« Frégate » 1966 & 1998



« Denise » 1987 & 1998

Today state



énergie atomique • énergies alternatives



France is the only NWS to have irreversibly dismantled its nuclear testing site

Radiological and geomechanical state



1998 : AIEA mission of international experts

Conclusions

- no radiological risk for population
- no geophysical risk
- no need for special remediation action
- no specific monitoring necessary

Despite the experts conclusions, France decided to continue to monitor the sites.



AIEA Report



énergie atomique • énergies alternatives

HEU production

Uranium

cea

énergie atomique • énergie alternatives



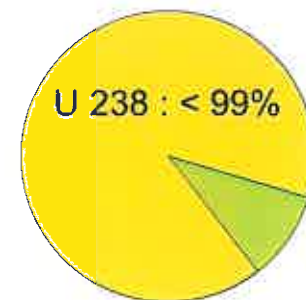
Naturel uranium ore



Ingot of enriched uranium



U 235 : 0,7 %



U 235 : > 1 %

Pierrelatte site



énergie atomique • énergies alternatives

Civilian enrichment plant

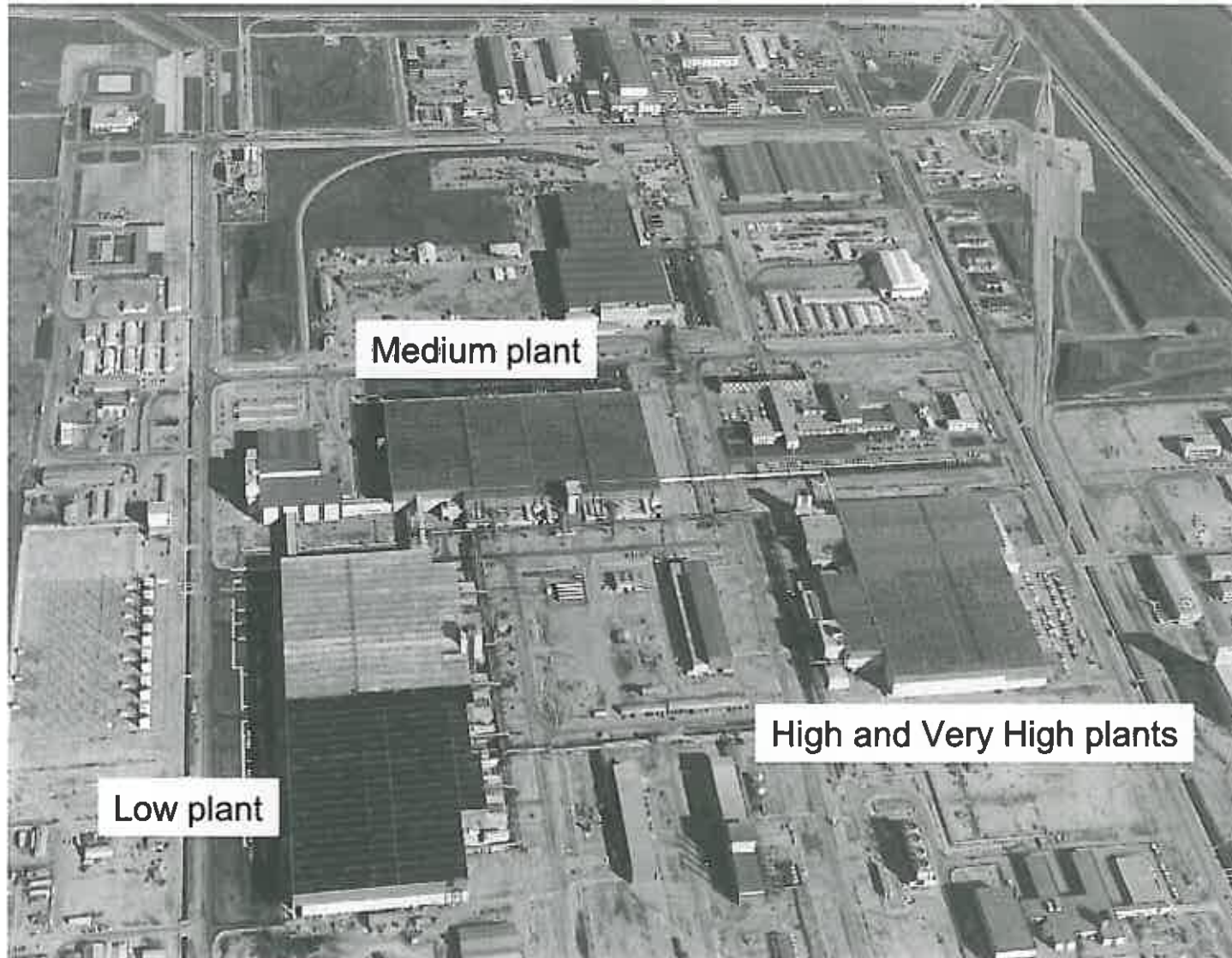


Defence enrichment plant

Pierrelatte defence enrichment plant



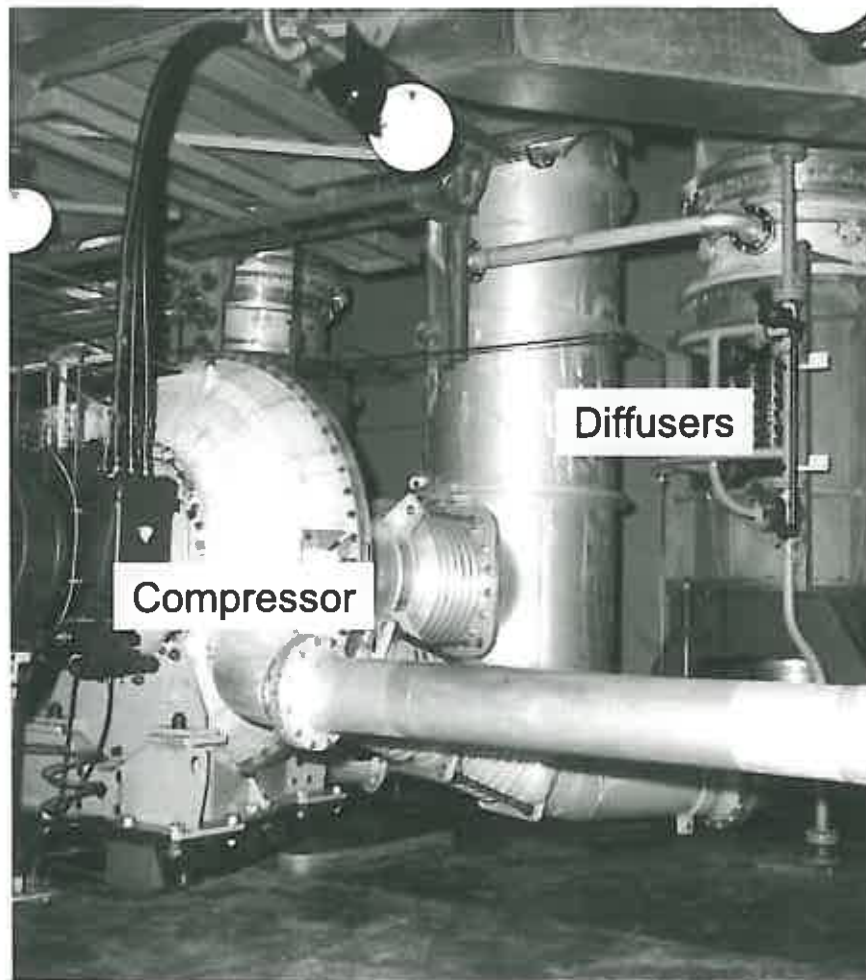
énergie atomique • énergies alternatives



Gaseous diffusion process



énergie atomique • énergies alternatives



A diffusion stage



Porous rods inside a diffuser

A very large facility

cea

énergie atomique • énergie atomique



Dismantling operations

cea

énergie atomique • énergies alternatives



Before & after dismantling

cea

énergie atomique • énergie alternative



Operating



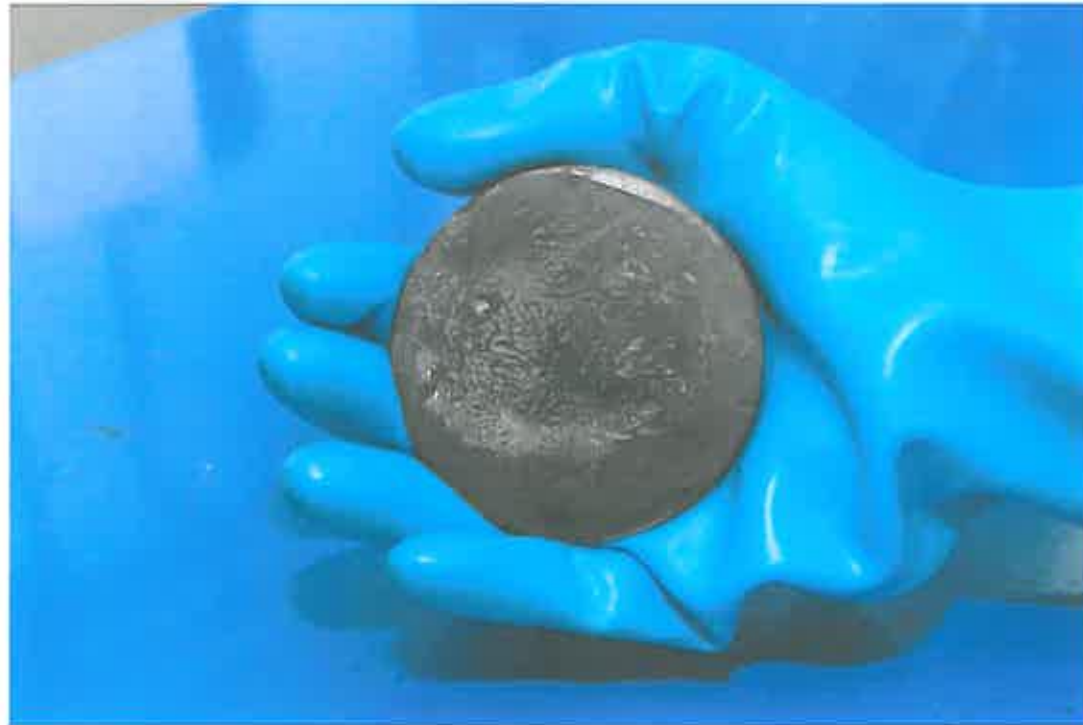
Now



énergie atomique - énergies alternatives

Plutonium production

Plutonium

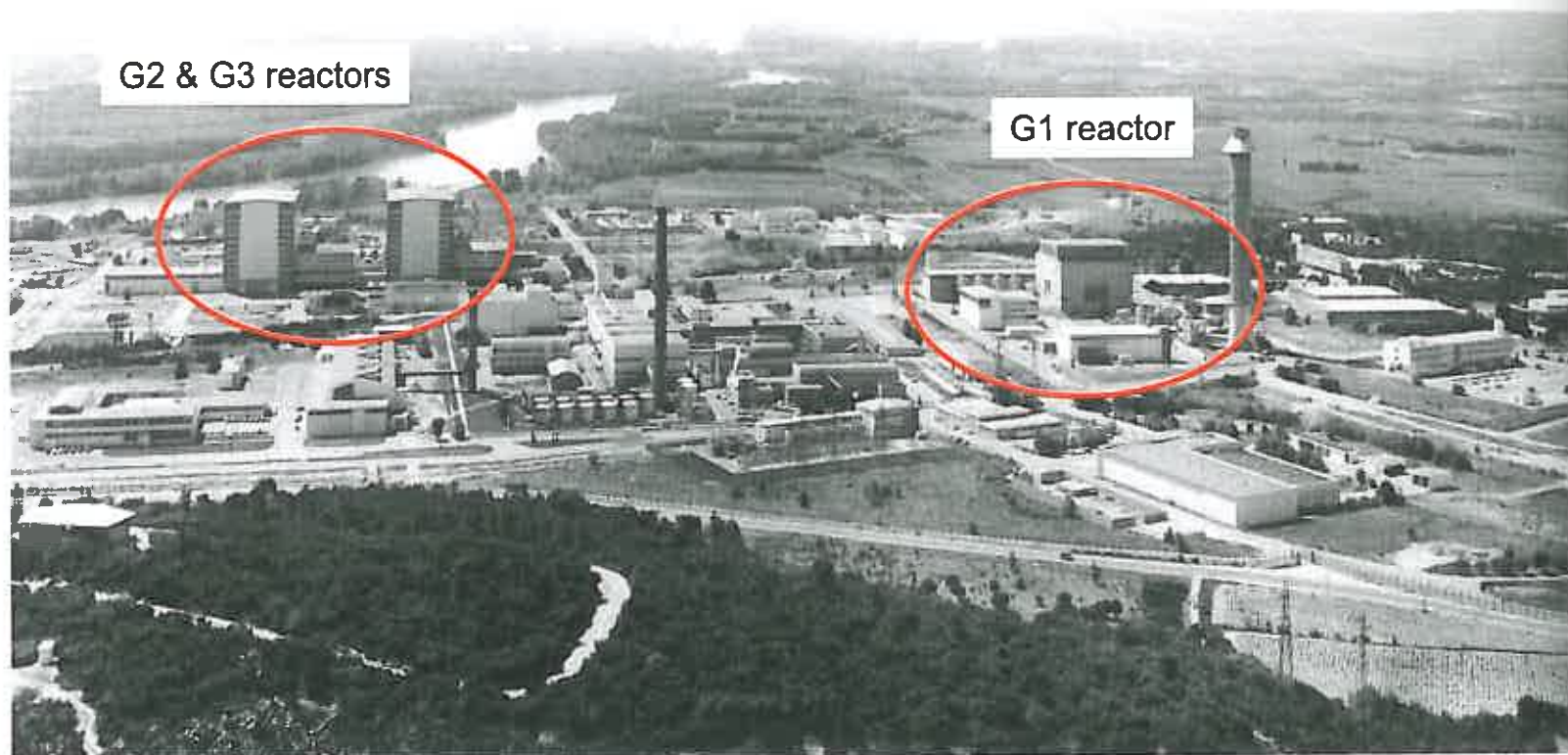


Plutonium ingot

Marcoule site



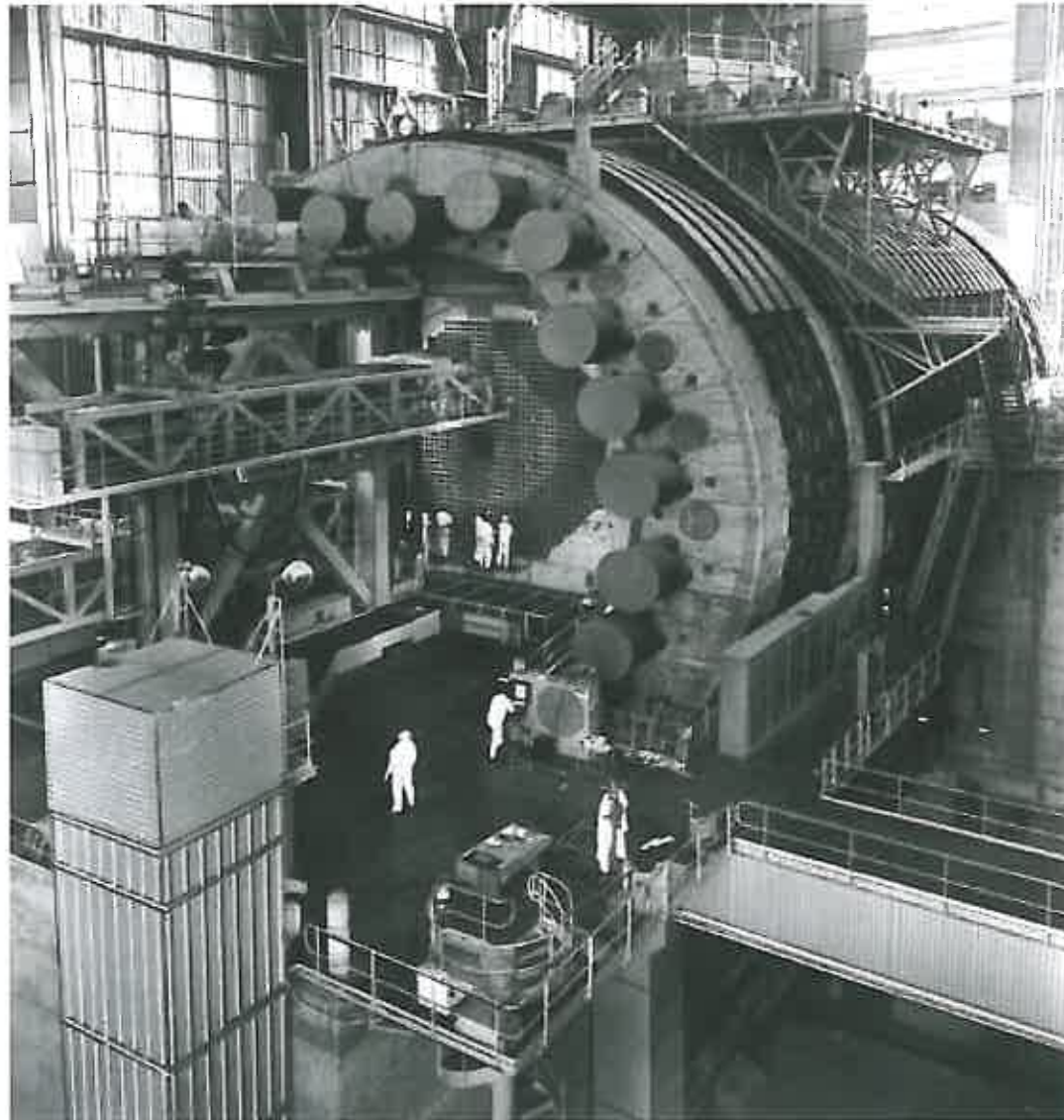
énergie atomique • énergies alternatives



Reactors for plutonium generation

cea

énergie atomique • énergies alternatives



Dismantling operations for reactors

cea

énergie atomique - énergies alternatives



Today state

cea



Operating

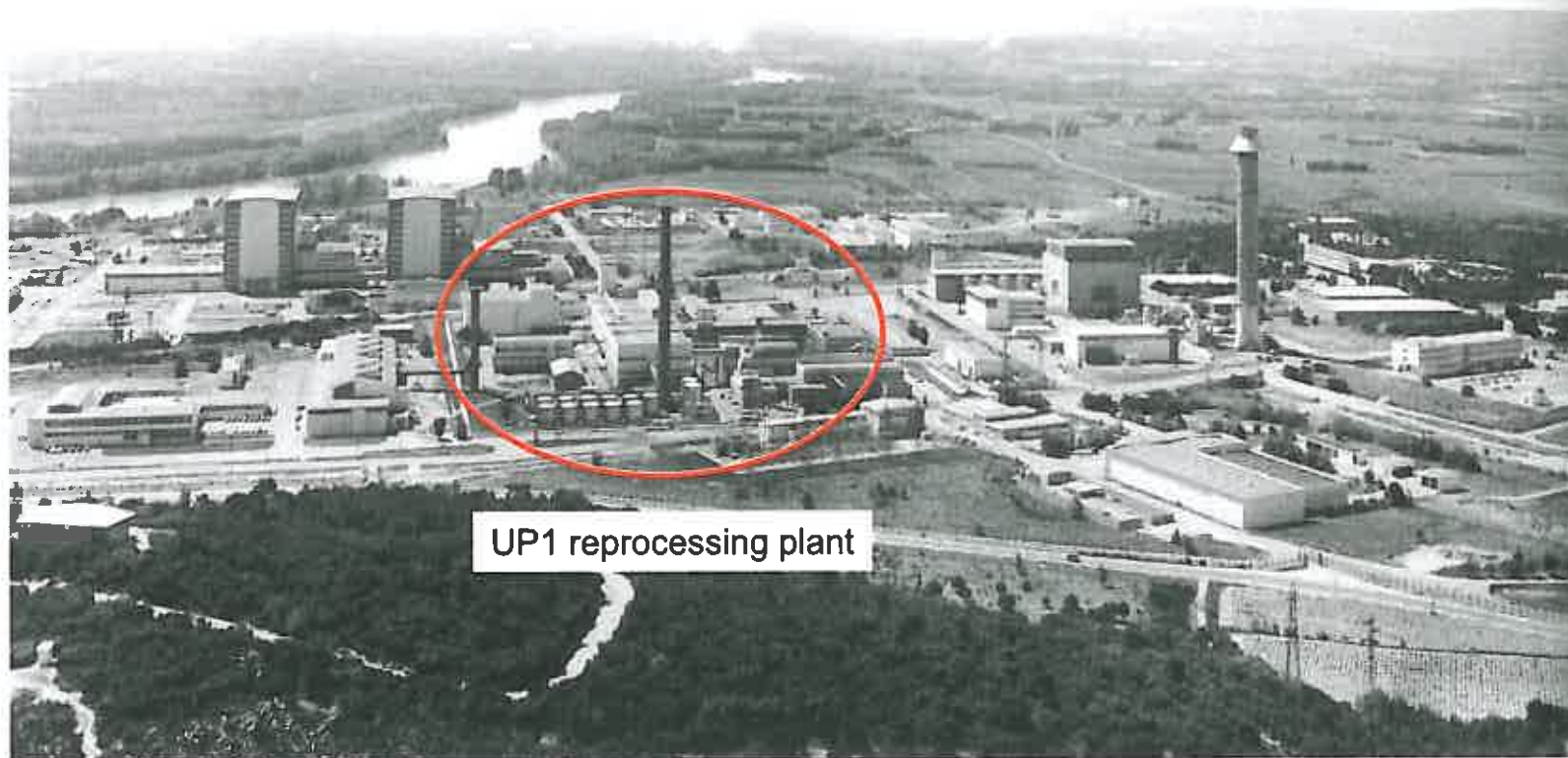


Now

UP1 reprocessing plant

cea

énergie atomique • énergies alternatives



UP1 reprocessing plant

Dismantling operations

cea

énergie atomique • énergie alternatives



Today state



énergie atomique • énergies alternatives



Operating



Now



énergie d'atome • énergies alternatives

Transparency

Transparency



énergie atomique • énergies alternatives



« I have decided to invite international experts to come and observe the dismantling of our facilities at Pierrelatte and Marcoule. »

Cherbourg speech, March 21, 2008

Transparency



énergie atomique • énergies alternatives



September 16, 2008

Representatives of Member States of the Conference on disarmament

Transparency



énergie atomique • énergies alternatives



March 16, 2009
Non governmental think-tanks experts

Transparency



énergie atomique • énergies alternatives



July 3, 2009
Journalists from international press

To sum up the French experience



Commitment **and** action



Irreversibility



Transparency

www.francetnp2010.fr

