WISE-Paris
Service Mondial d'Information sur l'Energie
World Information Service on Energy
http://www.wise-paris.org • e-mail : secretariat@wise-paris.org
31-33 rue de la Colonie F-75013 PARIS • Tél. +33 1 45 65 47 93 • Fax +33 1 45 80 48 58

BRIEFING

ATPu (Plutonium Technology Facility) at Cadarache

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Authors: Emmanuel Rouy, Yves Marignac, Xavier Coeytaux, Mycle Schneider

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ATPu (Plutonium Technology Facility) at Cadarache

1. Presentation of the ATPu

Location and purpose

The Cadarache nuclear studies center comprises a number of basic nuclear installations (BNI) on its site in the Bouches-du-Rhône region, France. The purpose of these installations is to ensure the industrial application of research and development into uranium and plutonium based fuels. Some units, operated by the IPSN (French nuclear safety authority), focus on research into safety (Cabri and Phébus reactors).

The plutonium technology facility (ATPu – Atelier de Technologie du Plutonium), involved in the production of fuels containing uranium, and the chemical purification laboratory (LPC – Laboratoire de Purification Chimique) ensuring production quality control and handling rejects, constitute the Cadarache center's plutonium fuel production complex (CFCa – Complexe de fabrication de combustible au plutonium). Like the entire Cadarache center, these installations were created by France's atomic energy authority (CEA – Commissariat à l'énergie atomique), which is still their sole operator. However, production at the CFCa has been carried out by COGEMA since 1991[1].

Production

Created in 1961, the two production lines at the ATPu have, since 1962, produced 25 tonnes per annum (tpa) of fast reactor fuel and 2.5 tpa of experimental light water fuel, metal fuels for various research reactors, the fuel for the French fast reactors Phénix and Superphénix as well as fuel for the Dounreay fast breeder reactor in Scotland.

In response to a request for authorization from the CEA for production of light water MOX, in 1987, re-examination of the safety of the facility by the safety authority – known at the time as the SCSIN (central nuclear installations safety department) – led to *"an authorization to pursue fuel production activities"*[2]. Within the framework of this procedure, the SCSIN authorized, in January 1989 (without a decree for BNI modification[3]), re-organization of the plutonium storage cells to allow production of MOX fuels for light water

[1] COGEMA has the been the industrial operator of the ATPu and LPC since 1991. CEA Cadarache's management indicates on its website that "*having become a COGEMA establishment in 1991, CEA Cadarache (the CFCa) has found its place naturally in the COGEMA Group's fuel production cycle*". However, the CEA remains the operator where safety is concerned. In the list of BNIs established by the DSIN, no change in the authorization of the ATPu (INB n° 32) or LPC (INB n° 54) has been reported since their respective declarations of 27 May 1964 and 8 January 1968 by the CEA. Decree n° 63-1228 of 11 December 1963, setting the rules applicable to BNIs and especially their regime of authorization, nevertheless stipulates that a new authorization is necessary for a BNI to change operator.

[2] *Bulletin Sûreté Nucléaire*, No. 67, 1-2/1989

[3] Under the terms of the Decree n° 63 1228 of 11 December 1963 on BNIs, a new authorization for a given BNI was necessary if "*modifications that could lead to failure to observe conditions previously imposed on the installation"* were made to it.

reactors, deeming that the *characteristics of these fuels are within [...] the more general envelope established for fuels for use in fast reactors*[4]

Once the necessary modifications were made, the CEA submitted a request in 1991 for modification of the installation, to allow setting up of a third line dedicated to light water MOX production, and with a production capacity of 40 tpa. This would have doubled the flow of plutonium through the installation[5], which led the safety authority to request a report from the CEA on the ability of the installation to withstand seismic disturbances. The CEA abandoned the authorization procedure at the end of 1991, preferring, in the end, to reconfigure the fast reactor fuel production line to produce light water MOX. The fuel for fast reactors would, in future, be produced on the smallest of the two lines, until then designated for production of light water fuels.

Fuel production has thus evolved from the original situation:

• production of fast reactor fuel has carried on until now. After manufacture of the two cores for Superphénix, the last delivery for Superphénix dates from 1996[6]. However, the ATPu subsequently produced fuel for the Superphénix reactor. According to Philippe Pradel, director of industrial production in the COGEMA's fuels and recycling department[7], a production run for Phénix was carried out this year (1.5 tonnes for 1999[8]). No further production run for this reactor is planned to date.

• Industrial production of MOX fuel for Pressurized Water Reactors (PWR) began in 1991, with a rapid increase in the rate of production[9]. The plant doubled its output over two years, going from 15.3 tonnes in 1993 to 31.6 tonnes in 1995. Production then increased rapidly from 1996, when a second grinder was brought into use and the Micronization Master-Blend (MIMAS) process was used at MELOX (which is alleged to reduce rejects). Output exceeded 40 tonnes in 1999.

The PWR-MOX produced was mainly intended for Germany. Again according to Mr. Pradel, EDF used MOX from Cadarache until 1996. Since then only a few fuel rods have been produced intermittently, for France's electricity company (EDF). The activity of the CFCa over the last few years can be considered as being almost entirely for contracts for supply of MOX to German operators.

It should be noted, in passing, that according to COGEMA (on the CEA-Cadarache website), the ATPu "*has two production lines with an annual capacity which can reach 35 tonnes of MOX fuel"*. The DSIN, for its part, estimates this production capacity to be nearer to 45 tpa (limited, essentially, by the capacities of the grinders)[10]. Philippe Pradel confirms the existence of these two lines and reports that only one of them is in use for production of MOX fuel for PWRs (or possibly boiling water reactors (BWR), although this is not planned at present).

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[4] *Bulletin Sûreté Nucléaire, n° 67, 1-2/1989.* It is stated that *"bringing into service of workstations assigned to production of mixed plutonium and uranium oxide fuel assemblies for light water reactors, [...] is authorized". T*elex of 13 January 1989.

[5] Around 2 t per fast reactor fuel line producing fuels with plutonium content of 14 to 20 per cent, plus 2 t from the MOX line for fuels with plutonium content of 5 per cent.

[6] Probably assemblies meeting particular specifications produced in the framework of the CAPRA program: COGEMA's 1997 annual report indicates that three experimental assemblies for fast reactors were delivered by COGEMA-Cadarache in 1996.

[7] Telephone conversation, 19 May 2000.

[8] DSIN, *1999 activity report.*

[9] See MOX fuel production histogram in Annex 7. Source: COGEMA-Cadarache, 30 April 2000.

[10] Personal communication of 26 January 2000 with V. Pertuis, Assistant Director of Fuel-Transport, DSIN.

The total amount of MOX produced annually at Cadarache at present is 40 tonnes, representing a little more than the annual production of MELOX, the main COGEMA plant producing MOX. Located in the same region, (at Marcoule, in the Gard area, France), MELOX now has a PWR-MOX production line for EDF and a PWR-MOX production line for foreign clients, especially Japanese. Unlike those for MELOX, the ATPu's authorizations do not include a limitation on annual production[11].

2. The problems of MOX production monitoring

The international context

A climate of suspicion and general disapproval has shaken the MOX industry recently. Falsification of MOX fuel inspection data at Sellafield (UK) and the UK Nuclear Installations Inspectorate's (NII) report mentioning "*systematic management failures*" in the British Nuclear Fuels Ltd. (BNFL) plant created suspicion between reactor operators and MOX fuel makers.

Double checking of MOX pellets is indispensable given the high level of production line rejects (very strict manufacturing specifications). The consequences of a departure from specified standards can be serious: rupture of cladding or bending of fuel rods preventing insertion of control rods into the assembly.

Japanese operators carried out audits on the Sellafield production line and forbade any new shipment of spent fuel to the UK reprocessing plant. Germany, followed by Switzerland and Sweden, then froze its program with BNFL in a similar manner. Even the UK operator, British Energy, seems to have decided to rapidly abandon reprocessing[12]

The Japanese and German audits did not spare other manufacturers. A delegation from Japan's Ministry of International Trade and Industry (MITI) and representatives of Japanese companies visited the Belgonucléaire plant in Belgium to check on the efficiency of quality control.

Questions of quality at COGEMA

It was in the context of quality control that COGEMA indicated to two German companies, Siemens and the electricity company Bayernwerk, "*a malfunction which occurred in a software"* at the ATPu. These two companies carried out a joint "*contradictory"* audit at the Cadarache plant. The malfunction concerned a batch of fuel sent to the ISAR 2 power plant, operated by Bayernwerk last December. The software in question recorded the second check on statistical samples of fuel pellets. In a COGEMA communiqué[13] of 30 March 2000, it is stated that the function of the software is to record "*secondary tests"* and that "*the computer system error [...] did not affect the quality of the MOX produced at Cadarache"*.

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[11] Created before the decree of December 1963 establishing the BNI regime, the ATPu and LPC were simply the object of declarations, in 1964 and 1968. In this case, production limits and numerous other operating constraints are fixed only by the safety report from the operator. In comparison, the MELOX plant (INB n° 151), much more recent, was authorized by a decree of 21 May 1990 establishing an annual production limit. This limit, of 115 tpa, was maintained by the decree of 30 July 1999 modifying the BNI and authorizing bringing into service of a second fuel production line.

[12] Michael Kirwan, financial director of British Energy declared, in the 11 May 2000 edition of the national daily newspaper *The Independent*, "*from our point of view, reprocessing is an economic absurdity and should be stopped immediately"*. On 19 May 2000, the national daily *The Guardian* confirmed that British Energy had started negotiations with BNFL to end its reprocessing contracts and convert to storage of spent fuel.

[13] COGEMA communiqué from communications dept. Vélizy, 30 March 2000, Annex 6.

This is the same formula as used by BNFL regarding its incriminated fuel. The deficient stage – the second quality control point for diameter of fuel pellets – is also identical to the UK case.

A special problem: exceeding of limits on americium

Formation of americium within plutonium is a general problem throughout the plutonium cycle: americium (^{241}Am, non fissile) occurs naturally with time in plutonium due to disintegration of the isotope ^{241}Pu (fissile), progressively degrading the energy quality of the plutonium. The level of americium in plutonium from recycling depends on two factors: the time that has elapsed since reprocessing of the plutonium; and its initial ^{241}Pu content.

Present developments in the management of the fuel cycle are leading to a reinforcement of the two factors: first, the constant increase in burn-up is tending to increase the average ^{241}Pu content of plutonium separated; second, imbalances in the flows of plutonium from reprocessing reused in fresh fuel are creating a storage effect and increased storage times for separated plutonium.

The ATPu, in its handling of plutonium, is authorized to receive americium, but within a limit value. According to technical requirements, the plutonium received must not contain more than 1 per cent of americium. Accumulation of plutonium stocks with high americium content makes respecting this limit difficult. It appears that, in the 1990s, the installation regularly exceeded this requirement.

Between 1991 and 1997, at least six cases were recorded (three of which in 1996-97) of the ATPu receiving batches with americium content above 1 per cent, dealt with on each occasion by a special authorization from the DSIN[14]. The appearance of this divergence from requirements for the installation, due to evolution of the characteristics of the plutonium, would justify a more systematic form of action than intermittent decisions. In particular, studies should be undertaken to qualify safety of the installation under the hypothesis of a raising of the 1 per cent limit on americium.

[14] In the 1991-1997 period, the safety authority issued at least six authorizations to the ATPu to receive batches exceeding the planned limit on americium. For example: "*the director of safety of nuclear installations authorized reception of batches of plutonium oxide exceeding the limit of 1 per cent set by technical requirements for the installation (letters of 9 September and 23 October)*", in *Contrôle* review, December 1997.

3. Closure of the ATPu

The seismic risk

This "*computer system bug*"[15] came at a very inopportune moment for the ATPu: the year 2000 marks the date fixed by André-Claude Lacoste, director of the DSIN, for closure of the ATPu. This request, which dates from several years ago, was motivated by doubts as to the seismic strength of the installation after an assessment carried out by the IPSN of the seismic risk in the Cadarache area[16].

An IPSN report[17] dating from March 1994 established that seismic activity in the Cadarache region "*shows significant recurrence since the end of December 1993"*. In addition, the document states that a segment of the Durance fault, a few kilometers from the center, "*has experienced notable activity on several occasions, not only since the setting up of the Cadarache unit (in 1966-67 and in 1985-86 especially), but also historically: it was the seat of intense activity throughout a large part of the 19th century beginning with an event of intensity VII-VIII on 20 March 1812"*. The environs of Cadarache are the seat of destructive seismic disturbances (maximum intensities reach VIII on the MSK scale[18]) with a return period of around one century. The last event of this type occurred in 1913.

On 27 January 1995, a meeting on this problem brought together Mr. Lacoste and managers from CEA, IPSN and COGEMA. In the meeting report[19], the DSIN states that the analysis presented by the IPSN "*indicates the necessity of rapid closure of the installation"*. Refusing to "*enter into an uncertain logic of reinforcement"* the DSIN "*requested that COGEMA should propose a scheme for the future of the ATPu, including a definitive and irreversible closure date for the installation shortly after 2000"*.

On 22 October 1997, in the absence of any response to his first request in 1995 on closure of the ATPu, and in spite of "*several reminders on his part*" (in June 1995 and June 1996), Mr. Lacoste repeated his request[20], in a letter addressed not to COGEMA but to the Director of CEA-Cadarache. Judging "*the situation to be unacceptable*", Mr. Lacoste insisted on receiving "*at your earliest convenience, the scheme adopted for the future of the ATPu"* and that "*a date be proposed for closure of the installation*".

A joint letter from COGEMA and CEA provided a reply from the "operator" only in December[21]. Far from contesting the problem of the seismic strength of the installation, both organizations recognized that "*since 1991, in-depth consideration had been given to the examination of [its] behavior in the event of an earthquake "*, indicating that "*reinforcement of the existing structures would be extremely complex*". The solution they proposed was "the

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[15] In the words of the COGEMA Cadarache's communications department.

[16] See the simplified seismicity map for the Cadarache region, Annex 8.

[17] IPSN report 1994, technical note SERGD 94/13.

[18] The MSK scale is a *qualitative* scale measuring the intensity of earthquakes and not their magnitude, as is the case for the Richter scale. In a Press file of January 1997, *Séismes et sûreté nucléaire (*earthquakes and nuclear safety*)*, the IPSN described the degree of intensity VIII of this scale – which goes from I to XII – as covering earthquake effects such as: "*massive damage: the most vulnerable houses are destroyed, almost all experience severe damage*".

[19] DSIN letter of 28 March 1995: DSIN/GRE/SD1/N°134/95, Annex 1.

[20] DSIN letter of 22 October 1997: DSIN/FAR/SD1/N°11708/97, Annex 2.

[21] CEA-COGEMA letter of 11 December 1997, signed by Marcel de la Gravières, Director of CEA-Cadarache, and Philippe Pradel, then Assistant Director of the reprocessing branch of COGEMA: DIR/CSN 97/982 - BR/SX 97/18, Annex 3.

creation of an entirely new superstructure which would fully encompass the "powder-handling part" of the existing installation *[...] and would guarantee confinement of [nuclear] materials"* in the event of a safe shutdown earthquake (SSE), the most serious earthquake to be considered for safety and fixed for the ATPu by the DSIN at an intensity of IX on the MSK scale[22]. Giving assurances that studies "*had concluded that such a project was feasible*", they envisaged "*being able to make the decision as to actual creation of this superstructure in the autumn of 1999".*

The Director of safety for nuclear installations returned to this project in another letter in February 1998[23], this time addressing it to the General Administrator of CEA. In his letter, the Director referred to this superstructure project as "*having attendant uncertainties"* and stating that "*its innovative nature [...] meant that it ran counter to [his] wishes"* expressed in January 1995. He therefore confirmed that the project "*does not correspond to [his] wishes which include [...] closure of the ATPu shortly after 2000, given the weakness of the installation and the seismic risk".* In the event of the corresponding scheme not being presented to him shortly, he threatened, though without giving details "*to take the necessary steps to remedy this situation".*

Five years after these initial exchanges and two years after this show of firmness, the situation appears to be at exactly the same point. The DSIN's 1999 report (submitted in March 2000) limits itself to concluding that "*to date, the operator has still not made its response known*"[24].

The industrial implications

The attitude of the operator or operators of the ATPu is explained by the significance of production for COGEMA's industrial strategy and for that of its German clients. The German electricity generators will need considerable amounts of MOX in the coming years, and the MOX production units, other than the ATPu in France and elsewhere in Europe, do not, at present, appear able to absorb the planned production at ATPu.

According to the operator PreussenElektra, on 1 January 2000, 262.6 tonnes of MOX fuel remained to be delivered under contract to all of the German clients[25]. The plants available in Europe for this production are: the BNFL plant at Sellafield (UK); the Belgonucléaire plant at Dessel (Belgium); and the COGEMA plants at Marcoule, France, (MELOX), and Cadarache, France, (ATPu).

Cadarache and BNFL have, to date, provided two-thirds of Germany's imports of MOX fuel. To fulfill its contracts with the German generators, COGEMA at Cadarache will have to keep its production unit running for another six years (at a production rate of 40 tpa).

As MOX imports from BNFL are now suspended (after the quality control problem explained above), only the plants at Dessel and Marcoule can offer an alternative in the event of closure of the ATPu in the near future. In practical terms, movement of the activity to Belgium appears impossible given the capacity of the Dessel plant.

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[22] The safe shutdown earthquake (SSE) is the historically most likely maximum earthquake of which the intensity on the MSK scale is increased by one point. The IPSN, in its 1997 press file (see above), indicates that an earthquake of intensity IX on this scale results in *"destruction of many buildings"*.

[23] DSIN letter of 23 February 1998: DSIN/GRE/SD1/N°35/98, Annex 4.

[24] DSIN report, *La sûreté nucléaire en France en 1999 (nuclear safety in France in 1999)*, page 307.

[25] WISE-Paris translation of PreussenElektra table, 14 January 2000, Annex 5.

"Blackmail" by COGEMA

In the strategy implemented by COGEMA, division of production between Marcoule and Cadarache is clear: the first production line at MELOX produces MOX for PWRs used by EDF, the second line, open since 1999, produces MOX for PWRs for Japanese clients, and for potential German clients. The ATPu produces MOX for PWRs for German clients.

The site at Cadarache, certified ISO 9002 and ISO 14001, has also obtained the Kerntechnischer Ausschuss (KTA) label specific to quality standards in the German nuclear industry. The ATPu is managed by the former director (of German nationality) of the MOX plant at Hanau, Germany, now closed.

Today COGEMA intends to continue production at Cadarache. Given the risk of an inadequate ability to withstand earthquakes, the DSIN has repeatedly requested[26], since January 1995, that – while awaiting the requested closure of the facility – "*compensatory measures be introduced immediately, for example, on the source term"*. This request did not prevent production from surpassing the 1995 level (31.2 t) in 1998 (36.3 t), in 1999 (40.2 t) and probably in 2000 (COGEMA forecast: 42.1 t), even going beyond the stated production capacity of the MOX -PWR line (35 t). However, the operator does state in a letter that, "*large scale investment, decided in 1991, and introduced progressively between 1993 and 1996 [...] has allowed [in particular] a reduction in the quantities of material present within the equipment at any given moment*[27]. COGEMA clearly wishes to gain maximum profit from the ATPu: "*from the industrial point of view, it would be highly desirable to obtain a return on the major investments [...] made since 1991, in the first ten years after 2000"*.

Would it be possible for COGEMA to transfer the production of MOX for Germany to MELOX? The company's response is negative, stating in the previously mentioned letter that: "*for technical, industrial and administrative reasons, no other installation would be able to fulfill this mission at present"*. The "technical" reasons do not, in reality, appear of prime importance: production of MOX for German PWRs is possible at MELOX, even though it would require some technical adjustments. It is the administrative and commercial constraints that are the determining factor.

With an authorized annual production capacity of 115 tonnes and production level at present close to that limit, the MELOX plant cannot absorb additional MOX production without reducing the quantities made for EDF. Under the present contracts for reprocessing between EDF and COGEMA, all of MELOX's output is not sufficient to ensure the balance of flows required in principle by EDF[28]. Furthermore, the planned workload for MELOX at present includes MOX production for Japanese and possibly German PWRs.

This process of saturation was foreseeable, and was predicted by the industrial concern COGEMA and by the safety authority. In 1995, the DSIN associated its request for closure of the installation with a proposal for "*two intermediary stages, one around 1995 relative to the*

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[26] This request, reported in the meeting report of 27 January 1995, was, for example, repeated in the letter of 22 October 1997.

[27] CEA-COGEMA letter of 11 December 1997: DIR/CSN 97/982 - BR/SX 97/18, Annex 3.

[28] EDF has around 850 tonnes of fuel with a plutonium content close to 1 per cent reprocessed each year at the La Hague plant, producing between 8 and 8.5 tonnes of plutonium. With, at present, an average plutonium content for MOX of around 6 per cent, it would be necessary to produce around 135 to 150 tonnes of MOX to use up the stock of plutonium accumulated each year. At the maximum level of 7.08 per cent of plutonium in the MOX, authorized since the end of 1998, MELOX's total output of 115 tonnes is not sufficient to use up the 8.14 tonnes of plutonium a year. The present situation therefore, inevitably, leads to an increasing stock of plutonium "on the shelf".

decision as to whether or not to include authorization for a MOX plant project in the decree authorizing La Hague, the other, around 1997, relative to the actual decision to build the plant[29]*".* For COGEMA, the solution is not at La Hague but at Marcoule: its project for MELOX is to reach a production level of 250 tpa, far greater than the 115 tonnes authorized when the first production line was commissioned and maintained at commissioning of the second one.

This is why the operator of the ATPu does not envisage closure of the installation in the present administrative situation: in its response of 1998 to the DSIN, it states, referring to production at the ATPu, that: "*in the future, only MELOX, with technical and administrative capacity extended to 250 tpa of MOX production, will be able provide such manufacture".* And it concludes that "*in these conditions, shutting down the ATPu cannot be envisaged, from the industrial point of view, before the MELOX plant has been developed as described above".* For the safety authority, this constitutes "*blackmail*" as attested by a comment in the margin of the letter in question[30].

The DSIN requests rapid closure of the ATPu. It is not favorable to the creation of an anti-seismic superstructure encompassing the ATPu as proposed by the operator to maintain its activity. However, it does not totally discount this solution but thinks that "*the erection of such a superstructure and continued operation of the ATPu [...] during the decade after 2000 would require, given the importance of the modification envisaged, a procedure for authorization by decree, with a public inquiry"* (letter of 18 February 1998 referred to above).

No solution for German plutonium

Given the amount of MOX that would still have to be produced at Cadarache for Siemens, and therefore for German clients[31], closure of the ATPu would have important implications for the management strategy for German plutonium. For example, the 40 tonnes of MOX produced annually at Cadarache for Siemens use more than 2 tonnes of plutonium. The total production of 262.6 tonnes still contracted for at the start of 2000 would use up more than 15 tonnes of plutonium.

In the absence of alternative capacity for MOX production, this situation will no doubt weigh on the negotiations on the future of the La Hague plant and especially those on "post-2000 reprocessing contracts". The total quantity contracted with German clients after 2000 is 1,127 tonnes, i.e. around 11 tonnes of plutonium. At a rate of 35 to 40 tonnes of MOX produced per year, with a plutonium content of between 5 and 7 per cent, the ATPu is able to use up between 1.7 and 2.8 tonnes of German plutonium per year: the reprocessing contracts for La Hague after 2000 therefore represent between 4 and 6 years of operation for ATPu.

The question of the future of the ATPu has taken on particular importance since the agreement on 14 June 2000 in Germany between the Federal Government and the electricity companies to shift away from nuclear power. This does not bring the present situation into question directly – especially the existence of post-2000 reprocessing contracts – contrary to the initial intentions of the Government, but it marks a clear desire on the part of the German authorities to cease recourse to reprocessing of spent fuel as soon as possible.

The agreement sets a definite term for this option, establishing that "*the only authorized form of management of radioactive wastes from operation of nuclear power*

[29] DSIN letter of 28 March 1995: DSIN/GRE/SD1/N°134/95, Annex 1.
[30] CEA-COGEMA letter of 11 December 1997: DIR/CSN 97/982 - BR/SX 97/18, Annex 3.
[31] The ATPu, qualified in accordance with Siemens technical specifications, produces fuels for Siemens which, in turn, has contracts with German electricity generating companies.

stations will, after 1 July 2005, be their direct storage[32] – in fact, companies will be able to deliver spent fuel to the reprocessing plants until that date. However, this term does constitute a maximum period, and companies will have to seek a more rapid end to reprocessing: "*in their negotiations with their international partners, the electricity companies must use all acceptable contractual solutions to bring reprocessing to an end as soon as possible".*

However, the most important clause is, no doubt, that "*reprocessing is subject to the prior demonstration of reuse without danger of the products from reprocessing, which must then be returned".* Such demonstration relies at present, implicitly, on the existence of a 'safe solution' for reuse of around 11 tonnes of plutonium which the La Hague plant would separate from irradiated German fuel under contract after the year 2000. The position of the French nuclear safety authority clearly demonstrates that that solution cannot be provided by production of MOX at the ATPu at Cadarache.

Media coverage of the Cadarache affair " Seismic shift? "

Without having been kept secret, the situation at ATPu since the IPSN expert reports in 1994 and the demand for closure made by the DSIN in 1995, has never been presented in detail to the public. The recent changes are Germany is creating a certain pressure favouring a public debate on the subject.

The media coverage of the affair started in the UK, with a article in The Guardian 19 July 2000. The same day, L'Agence France Presse (AFP) published two dispatches on the subject, one in English and one in German. The English dispatch was quickly withdrawn and replaced by a French dispatch from the industry department on 25 July. But the German dispatch was kept and followed by two others, on 21 July and 1 August. In the meantime, several newspapers published important articles on the issue, including die Tageszeitung in Germany and Libération and Le Monde in France.

In the words of COGEMA spokesman Jacques-Emile Saulnier , the event marks " the end of the arm-wrestling " that has been discretely going on between the company and the government for five years, and the beginning of a less tense interaction. This is, according to COGEMA, due to changes imposed by their new leader Anne Lauvergeon and not to overly heavy pressure from the media.

It is nevertheless the latter that has forced the main participants involved, and most important, COGEMA, to publicly state their will to get the affair " out in the open " Through different declarations[33], COGEMA has communicated their commitment made in the presence of Christian Pierret and Dominique Voynet, to propose different solutions for the ATPu in september " including the shut-down of the installation ". The company has stated it intends " to make safety and security their absolute priorities ", although it insists that the propositions must take into account the industrial, economical and social factors concerning the present installation.

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[32] Agreement of 14 June 2000 between Federal Government and electricity companies, translation WISE-Paris.

[33] The declarations quoted here are drawn from AFP sources (" MOX : la COGEMA fera de propositions prochainement sut l'avenir de Cadarache ", dispatch from the 25 July 2000, Paris), Nucnet (" Solution near on Cadarache MOX plant closure call ", dispatch of 27 July 2000; " COGEMA's Autumn Deadline for Cadarache proposals ", dispach of 2 August 2000) and *Le Parisien* (" L'usine de Cadarache pourrait fermer ", Paris, 3 August 2000).

The company puts emphasis on questions involving the future of the factory's 300 workers. COGEMA thus plays on a sensitive string, touching an issue dear to the Trades Unions who themselves did not wait to react.[34] The unions agree to refuse to accept " the selling off " of the plant that they judge to be " exemplary, considering all the distinctions it has received " and they expose " the crack-plot " organised by pressure-groups hostile to COGEMA. According to CGT-union, these are " dogmatic anti-nuclear groups " who want to " hinder scientific progress ".

On 26 July 2000, IPSN-experts published a brief information paper on the Moyenne Durance crack, presenting a resume of the main results of their studies on the past seismic activity in the crack, which confirm the DSIN expert reports from 1994. When questioned by Libération (article of 1 August, quoted above), Philippe Volant from the IPSN Seismic Risk Evaluation Bureau states that " the risk is not negligible and COGEMA has to take it seriously ". Thierry Charles, in charge of Safety Evaluation at the IPSN adds that " when you have this plant with a lot of powder and when it's resistance to quakes is not guaranteed, that causes problems particularly when it comes to containment. Libération says that in the case of a serious quake, the scenarios that COGEMA contemplates, would lead to 2,4 grams of plutonium being released into the atmosphere, this is 200 times higher than the maximum level authorised in Europe. Jean-Christophe Niel, head of the department of Safety Evaluation at the IPSN concludes in Le Monde that the IPSN does not at this point " have too much faith in any solution other than closure " .

The DSIN, on the contrary, tries to avoid a media uproar on this affair by putting it's importance into proportion. Even though the safety authority has always been very firm in their demand of fast closure of the plant, their deputy director Philippe Saint-Raymond starts to pull back. He deplores that " COGEMA does not seem to be in a rush " to close the plant (Le Monde 5 August 2000), although implicitly justifying their attitude by affirming that " we do not take any risk out of proportion by letting the installation run " (Libération, 1 August 2000).

[34] " Les syndicats de Cadarache ne veulent pas du " coup de la faille " " *Enerpresse* 7 August 2000, et " La CGT se mobilise contre les " antinucléaires dogmatiques " ", *Enerpresse* 16 August 2000.