

May 1998, a memorable PATRAM in Paris for some, but also a catastrophe for some who will never forget

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INTRODUCTION

Those who took part in PATRAM 1998, held in Paris, probably remember that it was a success.

For those who – like me, the Program chair of PATRAM - took part in the organisation, the pleasure of the participants was most gratifying.

However, few days before PATRAM 98, on April 30th, the French Safety Directorate – DSIN – had published a press release indicating that during the year before, some 35 % of the spent fuel transports to La Hague had shown some anomalies, detected during or after transports, in form of non-fixed contamination in excess of 4 Bq/cm², the international standards in this respect.

The thunderstorm which then developed immediately in the press and among the media, the reaction of some unions, the sensitivity of political circles (in France and in Germany especially), the legitimate emotion among the public, not to mention the active lobbying of the nuclear opponents lead – in a matter of days – to a complete stop of LWR spent fuel transports to La Hague and to Sellafield reprocessing plant, i.e. a catastrophe for a large part of our industry with a considerable damage to the image of all parties involved, and to some extent to the regulators. A catastrophe which remained, to tell the truth, largely unnoticed to most of the participants of PATRAM pleased by the conference and the discovery of Paris.

The paper explains briefly what the problem was, and the solutions adopted to rectify the situation. The paper will draw also the morale of this very sad situation.

THE HISTORY

For some 20 years, COGEMA had repeatedly complained towards some of the many plant operators sending their spent fuel to La Hague because, quite often, some surface contamination was found at places onto the surface of the casks or of transport vehicles – whether truck or wagon – despite the fact that the regulatory limits were always met on casks departure from the sites.

As the problem persisted, COGEMA and EDF – together – informed the French Safety Directorate in 1997 about the problem although they had no obligation to do it.

The Authorities then made their own investigations and finally released, on April 30th, the information that some 35 % of the transports presented some anomalies in excess of 4 Bq/cm².

Some of the important newspapers on May 6th, made their front page on the problem and, this very day, the French Railway Company decided to suspend immediately all transports of spent fuel in France, i.e. all movements to and from La Hague and Sellafield as the transports from continental Europe to United Kingdom are all done through France.

The French Prime Minister, on the same day, asked for a report from the Safety Authorities which report was delivered, just one week later, on May 13th.

Finally, after a long series of heated debates among all the stakeholders in France, (EDF, COGEMA, TRANSNUCLEAIRE, DSIN, OPRI, SNCF including the unions) and after extensive information towards the public in France and locally at each site, the transports from EDF power plants to La Hague could resume – one plant after the other – from July 7th, just after two months stop.

Because the context was very different, transports from other countries restarted later on or much later : Belgium in December 1998, Switzerland in August 1999, Netherlands in October 2000 and finally Germany in April 2001 after 3 years stop ... Germany being a very special case because beyond technical problems to overcome, same as elsewhere, albeit generally less frequent and less significant, there were some specific political considerations (the new red/green coalition came into power in September/October 1998) and also some complications between France and Germany, Germany having suspended the return of its nuclear waste to Gorleben.

Now, the situation is back to normal : all transports to La Hague and Sellafield have resumed, practically none of them present anomalies anymore, but turnaround times of the equipment have been significantly increased and the backlog caused by the transport ban has not yet been resorbed especially in German plants.

WHAT WAS THE PROBLEM ? And incidentally what it was not ?

Indeed the problem was quite simple and not so serious : on some surfaces of the spent fuel casks and of the vehicles very locally, some non-fixed contamination was detected upon arrival of the transport, not on departure otherwise the transport would have been postponed until the surface was properly cleaned.

It was possible to determine that these anomalies had been observed for many years (indeed as long as it was possible to return in the logbooks) and repeatedly at some power plants and this was really why the problem finally was serious (see figure 1).

Of course, contrary to what the press, some press, and the opponents said, at no time, never any cask had leaked, the containment having remained perfectly tight in the thousands and thousands casks movements being performed.

N° 1 – SPENT FUEL TRANSPORTS TO LA HAGUE – 1988 TO MAY 1998

| | Nb of cask delivered 1988 - 1998 | Nb of contamination observed | % |
|--------------|---|---|-------------|
| France | 1 618 | 384 | 24 % |
| Belgium | 181 | 31 | 17 % |
| Switzerland | 70 | 10 | 14 % |
| Netherlands | 110 | 7 | 6 % |
| Germany | 653 | 47 | 7 % |
| Japan | 385 | 15 | 4 % |
| TOTAL | 3 017 | 494 | 16 % |

What then was the physical problem ?

During wet unloading or unloading of casks, activity of the spent fuel pool can be transferred to the external surfaces of the cask. Activity in the pool may come from water soluble products or from floating insoluble particles. Contamination may also be transferred to the external surfaces of casks by contaminated tools, clothes ... during unloading operations. Vehicles may also be contaminated by the casks or by tools, clothes ... during unloading operations.

The origin of the problems observed is clear : it is not to be seen in the cask design as many reports said contrary to the evidence produced (see figure 2) or in COGEMA mismanagement of transport. The origin of the problem is the simple result of several small deficiencies :

- lack of rigor in the cask cleaning and surface checks at some plants, sometimes at the reprocessing plant but quite often at some power plants, the reasons being that :
 - . cleaning and checks are more difficult with a loaded cask than with an unloaded one, and
 - . experience is less important in a power plant where 3 to 5 casks are loaded in a year with different shifts than in a reprocessing plant where fully dedicated shifts of operators handle not less than 300 casks/year.
- insufficient communication on this question among operators and within some entities.
- absence in the regulations, whether national or international, of any obligation put upon the operators to report such anomalies to the authorities.

N° 2 – PROPORTION OF ANOMALIES (LOADED CASKS) 1988 - 1998

| | All origins together | All, except EDF, together | Germany only | EDF only |
|---------------------------|---------------------------------|--------------------------------------|---------------------|-----------------|
| All cask designs together | 16 % | 8 % | 7 % | 24 % |
| French types designs | 16 % | 5 % | 3,5 % | 24 % |
| Other designs | 19 % | 19 % | 15 % | |

Problems observed are very specific to EDF,
Problems are in no way specific to Germany,
Problems are not specific to TN designs.

Finally, looking to the circumstances a posteriori and from a certain distance the origin of the problems was double, if not triple :

- a) no well defined responsibility line within the plant operators in respect of "Nuclear Operator" liability in relation with transport activities performed outside of the relevant site,
- b) a lack of control by the authorities on a small segment of the fuel cycle where the risk is small and where nothing comparable with the problems met almost daily with the other transports of dangerous goods occurs ;

and may be a third point, it is uncertain whether it is a cause or an excuse, in any case it is an explanation :

- c) a regulatory limit of 4 Bq/cm² not well justified, not well specified (from AIEA Safety Series SS37 in 408.1 and 413.1 – it is difficult to see if it is an absolute rule or simply a guidance limit) and to tell the truth not at all suitable for spent fuel casks, whether loaded or unloaded.

Indeed very damaging for the industry and the authorities, the problems encountered during years had no sanitary consequences whatsoever as shown in all studies performed by well-known independent specialists (PSI in Switzerland, DSIN and IPSN in France, NRPB in the United Kingdom, GRS in Germany and IAEA) : the consequences towards the public, the workers and the environment were totally negligible. There is here no surprise to that : the limits given in the regulations are based upon extremely cautious assumptions as it is often the case in the nuclear field ; in the particular case, the limits are based upon hand manipulations of very small packages (up to several kg) while they are applied here in this case to very large packaging (100 tons) which are not accessible during the transport. Indeed, the limit of 4 Bq/cm² (Beta, Gamma) is not the limit between what is safe and what is unsafe but the limit between what is clean and what is not clean.

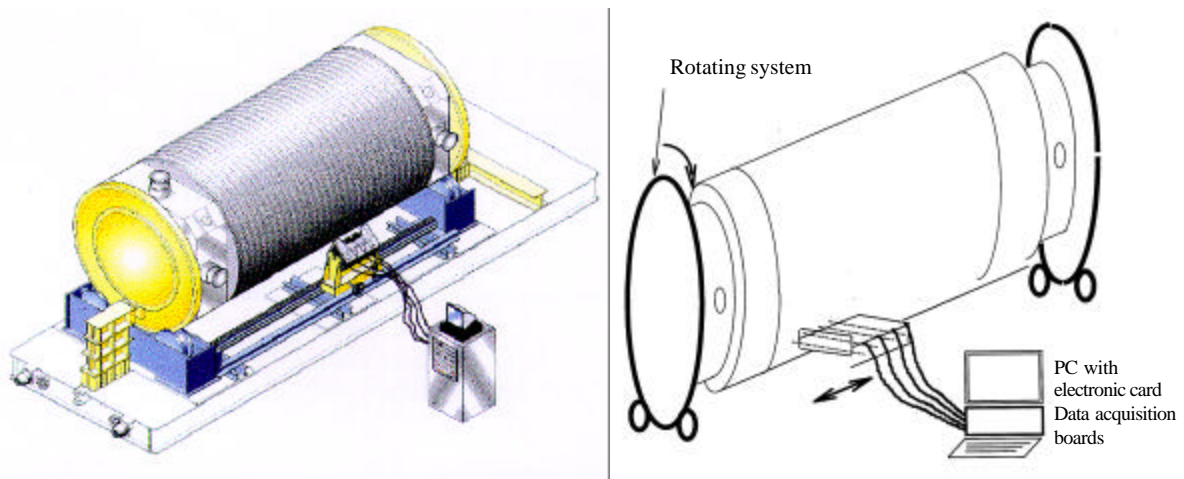
CORRECTIVE ACTIONS AND RESULTS

The root of the problem being identified as the result of a lack of cleanliness and a general lack of rigor, the improvements put in place are two folds : some technical improvements and some organisational changes. They could be put in place quite easily and rapidly.

Technical measures

- Greater care taken to prevent the outer surfaces of the equipment to get contaminated during loading and unloading phases of the casks,
- Greater care taken to avoid cross contamination by ancillary tools and equipment,
- Many more radiological check points and non contamination checks performed than before and use of harmonised monitoring techniques and procedures,
- Organisation of the working areas where non contamination checks are performed (work in areas protected from adverse weather conditions),
- Complete thorough check of the outer surfaces of all equipment before resumption of transports, with special focus on the casks fin area this covered also all the vehicles, the auxiliary equipment, the rail/road transfer sites ; etc (see figure 3).

N° 3 – CLEANLINESS CHECK OF AN EMPTY CASK



Organisational changes

- Setting-up of detailed, qualified, auditable procedures with the corresponding documentations (transport file),
- Implementation of a complete reporting system to implement when anomalies are detected (all sorts of anomalies) the authorities informed (eventually to the public too) on a regular basis or in real time in case of serious deviations,
- Improvement of the QA system on sites, with the designation at each site by the safety authority of a responsible manager especially acquainted with transport specifics and regulations,
- Creation of a central data bank (GRS in Germany) where all measures reported in the transport files are gathered and deviations recorded,
- Exchange of opinions organised among all key partners in order to establish a real return of experience.

In total, a very long list of improvements the main being clearly :

- Permanent cleanliness procedures on sites,
 - Consistent monitoring methods applied all along the transport chain and on the sites at both ends of the transports,
 - Increase of the number of radiological checks,
 - Double checking by an independent body,
- and, worth to be noted, the 4 Bq/cm² limit of the regulation remains unchanged.

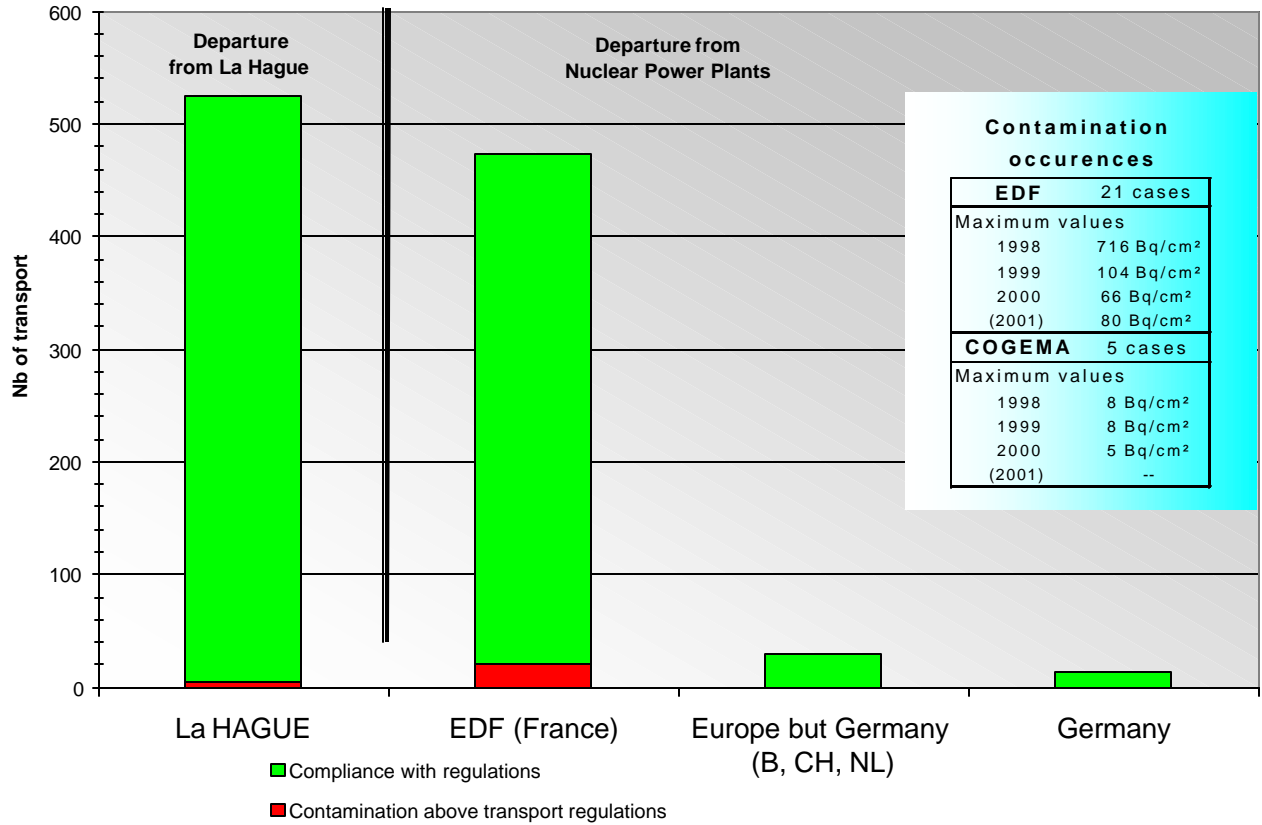
The results

The results achieved since the restart of transports, three years ago are excellent and still continue to improve (see figures 4, 5, 6 and 7)

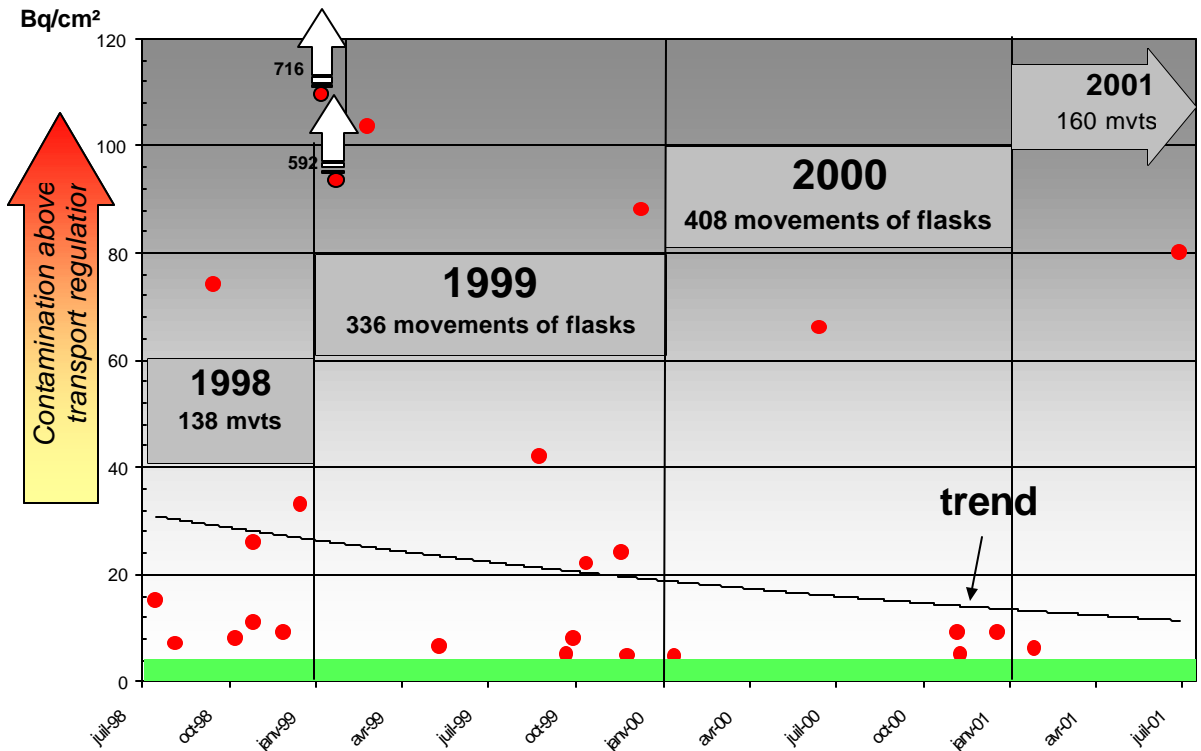
With the 1000 casks movements or so having taken place since then to and from La Hague plant, only 26 have presented one place of contamination upon arrival and to very low levels as compared to what was observed in the past.

The problems of the past have been clearly overcome, the phenomena are well under control : with some 500 000 smear tests performed, only 29 were found to be above the 4 Bq/cm² limit.

N° 4 – SPENT FUEL TRANSPORT TO LA HAGUE : JULY 1998 / MID-JULY 2001



N° 5 – CASKS MOVEMENTS TO AND FROM LA HAGUE



Some anomalies can still be observed from time to time, but it will account for less than 1 % of the cask movements.

A very good result indeed, the plant operators and the regulatory authorities have recently expressed their satisfaction of the results obtained and time is approaching when further improvements will be adopted, this time towards simplifications of the checks and documentation ...

Good results, very good results but none of the partners involved will forget April/May 1998.

CONCLUSION

Avoiding technical considerations and refraining from criticism against one or the other ... the fact is crystal clear : collectively altogether part of the industry and of the regulators have failed to address the problem properly in due course and, later on, when confronted to a major crisis. A problem, a mismanagement of some, has turned for everyone to a major difficulty very hard to overcome.

This morale to be drawn from all of that story is quite straightforward :

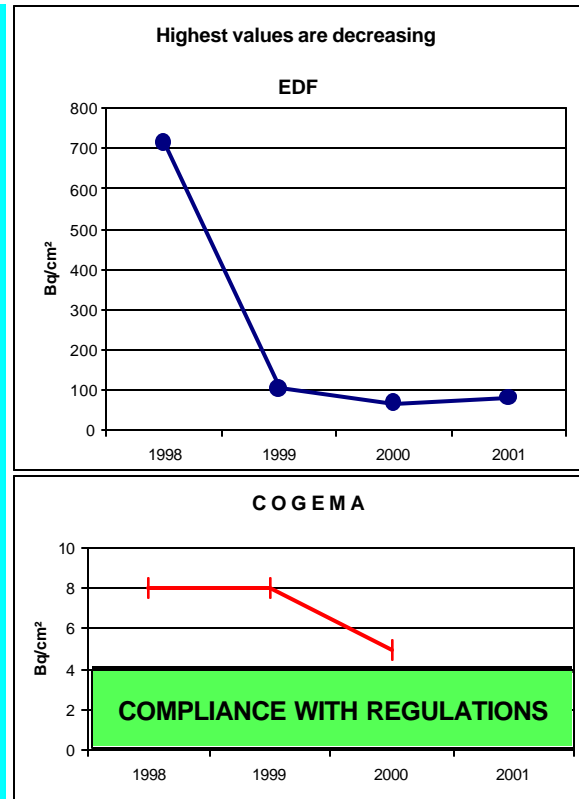
- 1 : Avoid by any means regulations making no sense, as afterwards it will be mandatory to comply with it.
- 2 : Comply strictly with all regulations, even if they are simply recommendations and inform always authorities in case of deviations even if they do not ask for explicitly and even if the deviation seems minor or of no consequence.
- 3 : Think always to the public and its possible attitude ; the public reacts or is lead to react, not necessarily because of the real risks but more generally because of perceived risks ... and then rationale vanishes and common sense disappears.

In a country where some consistency or some trust exists among all the actors, problems can have a solution in a matter of months but it would be unwise to count upon that, such countries - assuming they had ever existed – tend to disappear.

N° 6 – ANOMALIES OBSERVED

Contamination occurrences

| EDF 21 cases | |
|----------------|------------------------|
| Maximum values | |
| 1998 | 716 Bq/cm ² |
| 1999 | 104 Bq/cm ² |
| 2000 | 66 Bq/cm ² |
| (2001) | 80 Bq/cm ² |
| COGEMA 5 cases | |
| Maximum values | |
| 1998 | 8 Bq/cm ² |
| 1999 | 8 Bq/cm ² |
| 2000 | 5 Bq/cm ² |
| (2001) | -- |



N° 7 – SPENT FUELS TRANSPORTS

SPENT FUELS TRANSPORTS

Contamination above transport regulation
1997 - 15/07/2001

