



The nuclear waste crisis in France

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Since the origins of the French nuclear industry some 50 years ago, the management of nuclear waste has been largely neglected. Even today, large quantities of waste remain in unconditioned and unstable form, inventories of historical dump sites are lacking or were lost and one of the largest dump sites in the world near the La Hague reprocessing plant is leaking into the underground water. Now evidence is emerging that a new nuclear dumpsite in the Champagne region of France is leaking radioactivity into the ground water threatening contamination of tritium and at a later stage other radionuclides. The French nuclear waste authority ANDRA has only a partial inventory of the multitude of existing waste categories, as large quantities have not yet been declared by the main waste producers EDF and Cogema, including spent nuclear fuel or waste from the uranium enrichment industry. Even French government regulators are expressing their concerns over the conditions at both dump sites.

New nuclear projects threaten to make a crisis into an even greater nuclear catastrophe. Specifically, plans for an underground high level waste disposal site are moving forward. This would be located at Bure, again in the Champagne region east of Paris. Further, EDF is seeking approval for construction of the European Pressurized Water Reactor, EPR, at Flamanville. In addition to all the associated hazards, not least the reactors vulnerability to aircraft impact, the reactor is due to produce the most high level radioactive waste of any commercial nuclear reactor in France.

The nuclear power and reprocessing industry have created large volumes of waste, of which many are stored in an unstable condition. They have also illegally dumped tens of thousands of cubic metres of waste in France, without an option to ever take them back.

The European liberalisation of the electricity market and the partial privatisation of EdF have raised the question of who is going to pay. In 2004, in a first case, EdF has reached an agreement to transfer the financial liabilities for the waste it generated at the Marcoule reprocessing plant, in return for a one-off payment likely to be more than a billion of euros lower than the real disposal cost. A deal heavily criticized by the French Court of Auditors and currently under investigation by the European Commission for illegal state aid.

For almost 20 years, Greenpeace has consistently and successfully challenged these dangerous practices. A major breakthrough has been to halt reprocessing contracts of foreign clients with Cogema-La Hague, thereby effectively reducing the discharges of liquid radioactive waste and the transports of highly radioactive waste. Furthermore, in a landmark ruling, the French Supreme Court in December 2005 condemned Cogema for illegal storage of foreign reprocessing waste in France.

But still the nuclear waste crisis in France is growing. The French parliament is currently debating a revision of the nuclear waste legislation. This risks maintaining current practices of EdF and foreign electricity companies to dump the liability of their nuclear waste on French citizens, while maximising their privatised benefits. As no solution has been found for a sound management of nuclear waste, problems are meanwhile transferred to future generations. This is the real crisis of nuclear waste.

Centre de Stockage de La Manche (CSM): the leaking giant

CSM is with its massive 520,000 m³ one of the largest dump sites of nuclear waste in the world. Dumping started back in 1969 and continued for 25 years till its closure in 1994.



The main origin of the waste is from the reprocessing of spent fuel at Cogema plant in La Hague (30%), and from nuclear reactors of the French electricity company EdF (30%). There is some 59,000 m³ of foreign waste dumped in CSM, all of which is coming from reprocessing of spent fuel from German, Japanese, Swiss, Belgian, Swedish and Dutch utilities, despite the illegality of the dumping of foreign waste in France.

In 1996, the government-appointed Turpin Commission concluded that the site – which was designed to contain only low level waste – also contains long-living and higher radioactive waste and that the inventory was not exactly known.

As of 2006 the waste crisis at the CSM continues to get worse. The levels of contamination around the site are high. Water contamination from the CSM waste disposal facility migrates from the dumpsite into the underground aquifer. Farmers then access this water in two ways: directly from contaminated rivers and streams, and from deep wells. In the wells used by farmers to provide water to dairy cattle, levels of radioactivity are at 750 Bequerels per litre (+/-100Bq/l), seven times the European safety limit of 100Bq/l. In agricultural land close to the dumpsite, levels in the underground aquifer averaged 9000 Bq/l or 90 times above the safety limit during 2005.

A former senior engineer at the CSM site has confirmed that the leaking radioactive tritium is a tracer for what contamination will follow in the future – maybe tomorrow, or next month, or later. This includes plutonium and strontium. These are extremely hazardous materials are cancer causing and cause genetic damage.



Damaged and leaking waste barrels inside CSM

Centre de Stockage de l'Aube (CSA): State of the art leakage in the Champagne region

After closure of CSM in 1994, the so-called low and intermediate level waste was transported to CSA in the Champagne-Ardenne region. It is claimed to be the state-of-the-art technology, thereby implicitly

recognizing the shortcomings of its predecessor CSM. In the late 1980's when French waste agency ANDRA was seeking approval for the site, the people of Champagne were assured that there would be no radioactive discharges.



However, only after 10 years of operation, tritium leakage from CSA has been identified in the underground aquifer, while the site has no license to discharge any radioactivity. Furthermore, in a recent incident, a concrete cell containing the waste cracked under excessive pressure. This was assessed as a generic design failure by the French nuclear authority ASN in a letter of May 24th 2006 (see letter in annex). By the end of 2002 it is estimated there was as much

as 109 000 m³ dumped at the Champagne site as at the end of 2002. These are in concrete cells which are

now under suspicion of suffering fissures due to water migration.

Nuclear waste dumped at CSA is practically irreversible, as the cells are filled up with concrete once waste barrels are loaded in. This makes it impossible to take corrective measures when highly radiotoxic nuclides would start leaking in the aquifer, a probable scenario given the already identified design flaws and tritium releases. It should furthermore be noted that CSA contains important quantities of long-living alpha-emitters, which will remain radioactive for thousands up to millions of years, whereas CSA was designed to contain radioactivity for only 300 years.

As with the contamination of agricultural water used for dairy cattle in Normandy, the CSA site is a direct threat to the production of Champagne through the contamination of ground water used by vineyard owners.

Finally, like in the CSM, some waste is coming from the reprocessing plant of Areva/Cogema. During the 1990's 50% of the reprocessing waste at la Hague was generated from foreign clients. Of the waste disposed of at the CSA Champagne site, 20% is from Areva/Cogema. Therefore it can be said that during the last 10 years or more, 10% of the waste being disposed of at CSA Champagne belong to foreign clients in violation of French law. – The foreign clients of Areva/Cogema with waste in CSA are German, Swiss, Belgian, Dutch and Japanese nuclear utilities. Also the reprocessing waste of Australian spent fuel sent to La Hague will likely be disposed of at the Champagne site.

Bure: high level waste deep underground

Highly radioactive waste and waste containing high concentrations of long living nuclides are destined for disposal in deep clay layers. At Bure, in the East of France at the border of the Champagne and the Lorraine regions, ANDRA is operating a lab at more than 400m depth to study its feasibility.

If ever built, such disposal site would contain a gigantic amount of radioactivity for thousands up to millions of years and threaten the above aquifer which is today intensively used as well as the underlying aquifer which could be used in the future. Climate change could have far-reaching consequences on geology and hydrogeology.

The waste dumped deep underground would be practically irreversible. The concept would only include retrievability for the period of exploitation of the site, some 100 years.

Studies done on Bure lab had important delays, and currently high uncertainties exist about the feasibility of a underground storage. The period of time (up to 1 million years) and the complexity of the phenomena to study are so important that it is quite impossible to say that such a storage will be safe and will not seriously contaminate the underground aquifers which are linked to the "bassin parisien". Plans for a similar high level waste disposal facility in the Rhone Valley were scrapped a few years after strong opposition by the wine producers. The Cote du Rhone wine producers were opposed to the dump due to the threat to their vines and wine production.

Insufficient and uncertain financing of dismantling and waste

The production of radioactive waste not only creates an ecological crisis, but also an economic and financial crisis. The financial provisions of waste producers such as EdF are largely insufficient and not secure. A major part of the financial liability for the dismantling and for waste management, including foreign waste, will be transferred to the French society and taxpayer, while EdF and foreign utilities can avoid their responsibilities and maximise their privatised profits.

The French Court of Auditors (Cour des Comptes) estimates the cost for dismantling and waste management at 48 bn euros for EdF and 12bn for Areva¹. There is a very high level of uncertainty about these estimations, as recognised by the auditors of EdF². Current experience shows that the cost could be many times higher. Take the example of the Brennilis reactor, which is now being dismantled. The official cost for

¹ « Le démantèlement des installations nucléaires et la gestion des déchets radioactifs », Rapport Public Particulier, Cour des Comptes, janvier 2005

² AFP du 1^{er} avril 2003– Compte-rendu d'audience de la Commission d'enquête sur « la gestion des entreprises publiques afin d'améliorer le système de prise de décision »

this single reactor would be estimated at 19.4 million euros, whereas the real cost is now announced at 480 million, or 25 times higher. Also the cost for waste management is highly uncertain. In 1996, the French waste authority ANDRA estimated the cost for deep geological disposal at 14bn euros, whereas in 2003 its estimation was between 16 and 58bn. A more direct comparison is the current estimates being made for decommissioning and waste disposal in the UK. While only covering a proportion of the UK's nuclear program (spent fuel and high level waste, or plutonium) original estimates of 80bn euros, have in less than 2 years been increased to 100 billions³. These are early estimates with expected large increases in the future.

Apart of being insufficient, the waste and decommissioning funds are also poorly secured. EdF has been using these funds, financed by its clients as a levy on the kWh, to take over other utilities such as London Electric in the UK. The capacity to finance future waste management operations is thereby entirely dependent on EdF's financial situation, a high risk in the liberalised European electricity market. This leads to the conclusion by the French Cour de Comptes: *“without a mechanism to secure [the financing], the risk exists that, in the context of the opening of the capital of Areva and EdF and in markets which have become highly competitive, the financial consequences of the liabilities for the dismantling and waste management are poorly secured and that the charges will be transferred to the State”*

Greenpeace therefore demands that the the polluters (mainly EdF, Areva and their foreign clients of Cogema) are fully liable for their waste. First, an audit of the full costs for dismantling and waste management is needed. Second, waste funds should be separated from the polluters in a similar way as for pension funds. Thirdly, the polluters should finance the full cost.

In a first case, EdF and Areva have reached in November 2004 an agreement with the Government on the transfer of the decommissioning liabilities of the UP1 reprocessing plant to the French governmental CEA in return for one-off payments from each of the two firms. The *Cour des Comptes* which assessed the situation in January 2005, raised the question that this payment might be insufficient to cover the share of both companies in UP1. On 6 March 2006, Greenpeace submitted a complaint to the European Commission alleging that the 2004 restructuring has led to unlawful state-aid to EdF and Areva. On 4 April 2006, the Commission notified to Greenpeace that they opened the investigation (letters in Annex). This 'Marcoule case', which is limited to the dismantling of UP1, excluding the cost of the high-level waste management from reprocessing, could involve a subsidy to EdF and Areva of more than one billion euros. This significant is seen as a pilot case, which could be dwarfed by the overall costs for the dismantling all the 58 operational reactors and the management of the 1200 tonnes of spent fuel produced every year in EdF's reactors.

New waste legislation

The 15-year old waste law (called law 'Bataille') is currently being reviewed. A draft law has been voted in the Assembly and is now being debated in the Senate. By the end of the year, the French government needs to enact the new legislation.

In contrast with the 1991 law, which kept different options for waste management open, the new law prescribes deep geological disposal as the only option, without having a clear idea about the feasibility of it. The main grounds for this decision seems to be to create the erroneous impression that there is a solution for nuclear waste, in order to support the French nuclear industry.

The new law also paves the way for further reprocessing, responsible for creating large volumes of waste, and the construction of new reactors to use plutonium, thereby generating the most radioactive waste ever produced in France.

Greenpeace demands the rejection of this draft law which will increase waste problems.

³The Independent, January 3rd 2006.

Key demands:

1. End the production of more nuclear waste by phasing out nuclear power;
2. Immediately halt the reprocessing of spent nuclear fuel, its discharges of nuclear waste into the environment, and the multiplication of waste categories and volumes;
3. Develop a full and transparent inventory of all existing waste, including a detailed inventory waste of foreign utilities and including spent nuclear fuel, uranium waste and plutonium which are today not recognised as waste by ANDRA;
4. An independent and transparent audit of the full cost for the dismantling of existing nuclear reactors and nuclear facilities and the management of the nuclear waste;
5. The polluters (mainly EDF, Areva and foreign clients of Cogema) should cover the full cost of this waste management and provisions should be available in a short timeframe;
6. the provisions should be separated from the polluters;
7. As cost estimations are still highly uncertain, the polluters should remain liable for future cost increases;

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