About radioactive discharges

But they don't *dump* waste in the sea anymore, do they?

No, they don't, and that's a good thing. While sea dumping was already banned in the US in the 1970s, a European agreement was reached much later. The London Agreement became effective in the mid-80s. Until then, low and medium active waste was allowed to be dumped in the Atlantic, after being cemented or otherwise packed. Besides, you must realize that the further we go back in time, the bigger the influence of the military agenda was on environmental policies. The former Soviet Union for example has gravely polluted the Barents Sea (they even made nuclear ice breakers and remote lighthouses). Think of all the trouble the facilitation of a relatively simple low- and medium level waste storage building causes nowadays, and compare that to the situation before, when sea dumping was normal. These seem like total opposites, and raise the question why dumping has been allowed for so long in the first place.

The answer is both simple and cynical: cosmetics. While drums with radwaste are very visible and tend to raise awareness, the routine emissions from reprocessing plants into the air and into the sea are rather abstract. I am not an eco fundamentalist, but I do believe that the maritime ecosystem is better off without containers with nuclear waste which inevitably will start leaking sooner or later. Most people would agree on that, I guess. The only thing worse would be to not pack the waste at all and just let it become dispersed in the ocean and end up God knows where. This is exactly what normal liquid discharges amount to, day in day out. And we are not talking about much less radioactivity here, we're talking about *much more*.

How much then

Let's take the whole La Hague complex. Since Becquerels do not mean very much to most people, we will compare the emissions with those of a standard 1 GW(e) LWR under normal operation conditions (normal low enrichment, 80% load factor). I have used the Dutch 452 MW(e) Borssele PWR as a reference for extrapolating average discharges (not licences). Please keep in mind that one should compare radioactivity figures in terms of powers of 10 or so. Minor differences like a factor of 2-5 can easily occur from year to year, they hardly mean anything. One year of operation of both UPs at nominal capacity means that 1600 tons of fuel have been reprocessed, which is the equivalent of the annual reload of some 60 standard 1 GW(e) LWRs. So all figures are normalized to 1 GW electricity generation, the LWRs generate it, the reprocessing plants handle the corresponding spent fuels. Using recently disclosed Cogema figures for the annual discharges (quoted by Greenpeace, I presume for the year 1994) and a limit value for the annual liquid discharges excluding tritium (according to a CEA paper), this is the stunning result:

	GASEOUS EMISSIONS		LIQUID EMISSIONS	
	Noble gasses	Tritium	Beta & Gamma	Tritium
LWR discharge, TBq/GW(e)	10	1	0.005	5
Cogema discharge, TBq/GW(e)	3000	1	1.6	135
Cogema licence, TBq/GW(e)	???		28	

In 1994, the possibility of financial aid for waste management to the successor states of the former Soviet Union under the European TACIS assistance program was being discussed. "An EU mission is to evaluate the risks of the radioactive pollution in the Barents Sea. Between 1960 and 1991, the former Soviet Union disposed of 90,152 TBq into the Arctic, according to the IAEA", a NUKEM Market Report special on waste management read in 1995. Surely, "assistence" means investments from Cogema, BNFL, Siemens or Belgonucleaire, but that is not why I quote this. Cogema's 8200 TBq total liquid discharge in a year makes you wonder why there has been no EU mission to the northern French coast, because what the Russions could manage in 30 years, Cogema can in 11 years! If we add the THORP complex (1200 tHM/yr) and assume simular discharges, the score is

only 6 years. In other words: **While the pollution of the Arctic is being viewed as a serious ecological problem, the fact that routine discharges from the European reprocessing industry amount to a fivefold more release of radioactivity in the ocean usually doesn't get any attention at all.** There are of course countries that do complain a lot, like Iceland which has to put up with both Sellafield and Dounreay. But I don't suppose I have to explain how power is distributed in the European community, and so far nothing has really changed.

Furthermore, it is interesting to mention that the globally installed nuclear power capacity is only about 300 GW(e). **So Cogema alone emits about sixty times as much radioactive noble gasses as all the reactors in the world do together. For beta and gamma activity in the liquid discharges, excluding tritium, that figure is a factor of 64, while they are licensed to discharge even over 1000 times as much as all NPPs together normally do!** When the Germans built a somewhat similar 300-500 ton/year reprocessing plant (Wackersdorf, which has been abandoned) situated near a river and not near the coast, design emissions were very small compared to the UPs. In fact, for liquid emissions, the discharge limits differed a factor of 1200 for alpha activity, and even 40,000 for beta emittors like Cs-137. It may be argued that it would be fair to devide these figures by four because of the scale difference. Anyhow, this too shows the unnecessity of the current go-ahead granted by French authorities, which conveniently provided the Cogema people with the "appropriate" legal position needed to face the uncertainties of commercial nuclear adventure.

It is not very surprising that **over 95% of all radioactivity entering the Atlantic from European nuclear facilities come from La Hague and Sellafield.** Alarming numbers of a threefold higher rate in child leukemia in the La Hague area and up to a fourteenfold higher rate in the Sellafield area have occasionally been reported, and were most often simply pushed aside by the "only x% of limit" cheering. Official investigations seem to have the mysterious tendency to end in statistical obscurity. The famous sentence that "while nuclear activities cannot be ruled out as a possible explanation, no hard evidence could be drawn from the data" is not exactly a decent way of trying to reach a compromise between energy policy choices and expressing concern about people who are at least *very likely* to have caught leukemia as a result of it. The blunt way in which these two are weighed (and actually *compared*, not to mention the outcome) must be very offensive to those people involved.


(c) Greenpeace/Gleizes

Fortunately, it appears that there are a few recent breakthroughs. La Hague is under scrutiny now because of leukemia studies. Greenpeace has played a major role in raising awareness by showing the La Hague discharge pipe to the world (see picture on the right, taken from their site) and by taking samples which showed what every sane person already expected: the area should be classified as nuclear waste rather than a recreation beach (!) and now the Cogema people have some serious problems. And in the UK, a recent study revealed that throughout the UK and Ireland teenagers' teeth contain plutonium, the closer to Sellafield, the higher the concentrations. The plutonium industry has known better days, that's for sure, but the future will tell if the relevant authorities have the courage to speed up the endgame. Until then, there will be victims in the name of prosperity, or progress, or even just vanity.