Plutonium warning for Fukushima 3: MOX alert

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The Tokyo Electric Power Co (TEPCO) manages the nuclear reactor of Fukushima Daiichi where there have been explosions, and that of Fukushima Daini a dozen kilometers away, comprising in total 10 reactors that supply electricity to the region and the city of Tokyo.

These function with boiling water, heated by atomic fission in the fuel rods until it turns into steam, which is then sent directly through a primary circuit that is radioactive to the electric generator.

This system is entirely different from the reactors based on pressurised water (REP) used in France, which have a secondary non-radioactive circuit with a heat exchanger that supplies the generator turbine.

Faced with the succession of natural catastrophes that have hit Japan following the earthquakes, and in addition to the human dramas, it is essential to look at the risks that could threaten the future of the biosphere over a more or less vast area, possibly over the whole country of Japan and its neighbors, and worse still, that could set off an environmental catastrophe for the whole planet.

In the Fukushima nuclear site the sequence of catastrophe could well reach a climax with reactor 3, which is 34 years old and was fuelled for the first time in August 2010 with MOX fuel supplied by AREVA.

The daily Japan Today of Sunday 22 August 2010 headlined the story:

"MOX fuel loaded into Tokyo Electric's old Fukushima reactor"

"Tokyo Electric Power Co loaded plutonium-uranium mixed oxide fuel Saturday into a reactor at its nuclear power plant in Fukushima Prefecture in preparation for the largest Japanese utility's first plutonium-thermal power generation. The No. 3 reactor at the Fukushima No. 1 plant would be the third in Japan to be used for the so-called Pluthermal generation, but the only one among the three to have been subjected to anti-aging treatment with 34 years since its launch."

Two comments appear beneath the article: *"Incompetence at Japanese nuclear plants makes this a way bigger danger to humanity …"*
The second was premonitory: "*Maybe they forgot to tell everyone how they've determined there will never be any more earthquakes. Idiots are indeed correct. Likely long-term pain for short-term gain."*

Another article in Japan Today of 18 September 2010 headlined:

"Pluthermal electricity production has started in the Fukushima 1 reactor"

"The company said the alarm light indicating the conditions of the pipe valve for the emergency core cooling system did not function properly."

In the light of the events of March 2011 this comment takes on much greater significance.

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MOX, meaning "mixed oxides", is a highly dangerous and toxic fuel consisting of about 6-7% plutonium dioxide (obtained by re-treating used nuclear fuel) mixed with new depleted uranium dioxide. The fusion process starts more easily with MOX than with the usual fuels and it is used in 20 of the reactors in France.
The major problem is that the plutonium in MOX is highly toxic in both the short and the long term.
When suspended in air, it is estimated that a dose of about 10mg can cause the death of someone who has only once breathed in plutonium oxide. Evidence shows that even a tiny dose will trigger tumors in the lungs, and what's worse, a significant part of what is breathed in passes through the lungs into the blood, which then carries it into other organs (lymph nodes, liver, etc), more or less quickly depending on the size of the particles, thus causing further cancers.
Because of its isotropic composition it is able to contaminate considerable volumes of sea water for a century, which is equivalent to its half-life in the best circumstances, and in the worst for 240 centuries!

The plutonium which is produced in the heart of a nuclear reactor through the process of neutron flux has a very high rate of deadly radioactivity, but all the isotopes and other compounds of plutonium are also very dangerous and radioactive. [Wikipedia Plutonium]

What makes it particularly dangerous is the powerful energy of its emissions of alpha particles of 5 MeV compared with the 0.02 MeV of tritium.

According to the very latest news the old reactor 3 at Fukushima Dai Ichi has begun to go into meltdown, thus it is possible, even probable, that it will collapse. This would cause a massive dispersal of highly radioactive and deadly particles into the environment and the atmosphere.

The worst of it is that at 784 MW, reactor 3 is 1.5 times more powerful than reactor 1 at 460 MW, which is fuelled with enriched uranium, thus its load of fuel, ie plutonium, is much greater and the heat caused if it is stopped would be very much more intense and harder to manage.

But there is an even more appalling possibility with reactor 3: the MOX fuel with its much lower fusion threshold compared to other fuels could in a worst-case scenario - as with the present series of accidents - set off a nuclear chain reaction that could go out of control.

Additional problems are making the situation even more difficult for the duty firemen who are sacrificing themselves to prevent the core from melting. The mix of water and boric acid that is used to lessen the heating caused by radioactivity (it absorbs neutrons) is less effective with MOX.

If you look at the figures they are terrifying: reactor 3 contains a massive amount of plutonium, several hundred kilograms, thus for the first time in human history there could be a planet-wide catastrophe caused by man himself.

Meanwhile there is no escape via the media in France, where a duo composed of a man who knows everything called Eric Besson (industry minister) and the perennial Natalie Kosciusko-Morizet (ecology minister), who knows nothing but produces a lot of empty talk, do not breathe a word about MOX*.
(* Japan's MOX = AREVA France)

This double-act is trying to reassure anyone who will listen by repeating that it was not the nuclear core that failed in the Fukushima Dai Ichi reactors but the conduits, that's to say the cooling and emergency systems damaged by the tsunami, something that is inconceivable in France, and so on and so forth.

Certain dangers arising from natural catastrophes are by definition impossible to control, thus it is not possible to manage an atomic power plant with zero risk. The truth of this is currently being revealed for all to see, thus it is up to those in authority to draw the obvious conclusion.

Andréas Heumann, researcher at CNRS, has put it plainly: *"The problem with nuclear power is that the technology cannot be totally controlled; control can be maintained under normal conditions but there are so many abnormal situations that can arise."*

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