

Fukushima and the Case Against Nuclear Power

Gordon Taylor

G T Systems

www.energypolicy.co.uk

December 2011

Critical Issues for Nuclear Power

- The consequences of Radioactive Releases – personal, business, land loss and costs
- From Reactor Safety Studies, the worst releases result from 'Loss of Cooling Accidents'
- These happened at Three Mile Island, Chernobyl and now Fukushima
- After shut-down, all nuclear fuel produces 'Decay Heat', which can lead to radioactive releases

Consequences

- Over 12,000 workers have so far been exposed to up to 250 mSv, and several to more, killing 1
- About 80,000 persons have been forced to flee the fallout, which has also been found in many foods
- More than 8% of Japan has been contaminated and an area the size of Tokyo lost for decades
- Decontamination may require 4 cm of topsoil to be removed, but no-one knows where to put it

Costs

- Compensation for up to 1 million persons and 300,000 businesses may cost ¥ 3.6 tn (\$ 47 bn)
- Decommissioning the plants and cleanup of some of the land may cost over ¥ 10 tn (\$ 130 bn)
- But the insurance fund is only ¥ 120 bn (\$ 1.6 bn) and TEPCO is virtually bankrupt
- So nearly all must come from the taxpayers
- This money cost implies energy and GHG costs

And It Could Have Been Far Worse

- The insurance market realised that the size of the release and the liability are both unknowable
- An UK NII study considered a release of 66 x
- It could be far more and recent reactors are ~ 3 x
- Only 19% fell on Japan, but 100% implies 5 x
- The combined effect could be ~ 1000 x
- The radioactive plume passed over Tokyo – population 38 million - but it was not raining

Rational Energy Policy

- Others are adopting safer, sustainable and infinitely cheaper solutions for supplying energy services
- So there is no case for adding to our huge nuclear debts and dangers
- As the consequences are completely unacceptable, all nuclear power plants should be phased out

Thank you for your attention

Gordon Taylor

G T Systems

email: gordon@energypolicy.co.uk

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Loss of Cooling - 1

- Decay Heat – in the Reactors and Spent Fuel Pools - requires pumped cooling for years
- Losing both the grid connection and standby generators is known as 'Station Blackout'
- Thereafter the cooling pumps depend upon batteries, lasting only 4 or 8 hours
- Unless grid or standby power is restored, the Reactors and Spent Fuel Pools will overheat

Loss of Cooling - 2

- Reactor fuel can reach 'Melt-down' in a few hours releasing highly radioactive Fission Products
- At the same time, the overheated fuel cladding produces hydrogen, which will probably explode
- The explosions will breach the final containment so releasing Fission Products to the environment
- These are carried by the winds until they fall out and by any water pumped in for cooling

Rational Energy Policy - 1

- Oil is used for transport, gas and coal for heat and power, but what is electricity used for and how much less could we use for the same service ?
- In the UK, electricity is 20% of energy and nuclear is 20% of electricity = 4% of energy, so what shall we do to replace the (depletable) uranium ?
- And to replace the 96% that is oil, gas & coal ?