

# Re: Nuclear Power: Unsafe, Uneconomical, Unsustainable

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On 4 Feb, 20:16, richard schumacher <no-s...@xxxxxxxxxxx> wrote:

You need to educate yourself about

- reprocessing
- fast breeders
- thorium fuel

and then check back with us.

Nuclear Waste and the real economics of nuclear power  
by Peter Bunyard (extract)

"A critical point about the practicability of nuclear power to provide clean energy under global warming is the quality and grade of the uranium ore. The quality of uranium ore varies inversely with their availability on a logarithmic scale. The ores used at present, such as the carnotite ores in the United States have an uranium content of up to 0.2 per cent, and vast quantities of overlying rocks and subsoil have to be shifted to get to the 96,000 tonnes of uranium-containing rock and shale that will provide the fresh fuel for a one gigawatt reactor [1].

In addition, most of the ore is left behind as tailings with considerable quantities of radioactivity from thorium-230, a daughter product of the radioactive decay of uranium. Thorium has a half-life of 77 000 years and decays into radium-226, which decays into the gas radon-222. All are potent carcinogens.

Fresh fuel for one reactor contains about 10 curies of radioactivity (27 curies equal 1012 becquerels, each of the latter being one radiation event per second.) The tailings corresponding to that contain 67 curies of radioactive material, much of it exposed to weathering and rain run-off. Radon gas has been found 1 000 miles from the mine tailings from where it originated. Uranium extraction has resulted in more than 6 billion tonnes of radioactive tailings, with significant impact on human health [2].

Once the fuel is used in a reactor, it becomes highly radioactive primarily because of fission products and the generation of the 'transuranics' such as neptunium and americium. At discharge from the reactor, a tonne of irradiated fuel from a PWR (pressurized water

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reactor such as in use at Sizewell) will contain more than 177 million curies of radioactive substances, some admittedly short-lived, but all the more potent in the short term. Ten years later, the radioactivity has died away to about 405 000 curies and 100 years on to 42 000 curies, therefore still 600 times more radioactive than the original material from which the fuel was derived [3].

Today's reactors, totalling 350 GW and providing about 3