TOXIC LEGACY

As the UK looks set to push ahead with another generation of nuclear power, we thought it time to take a look at a dangerous legacy left behind by previous and current generations of nuclear power: nuclear waste. **Will Simpson** reports

Possibly more than any other energy source, nuclear power enrages and enflames. You either accept that it and its toxic byproducts are necessary pieces of the modern energy jigsaw, or regard them as unsafe, unclean and unwanted. It's a political hot potato, which everyone seems to have a standpoint on.

This was never more true than in the 1980s when, in the wake of Chernobyl and a succession of leaks from the Sellafield reprocessing plant, the nuclear industry's public image took a nosedive. Government policy later reflected this – indeed, as one by one the first generation of British nuclear reactors closed during the 1990s and 2000s, they were not replaced. In 1997, some 26 per cent of our electricity was produced by nuclear power, but by 2009 that figure had fallen to just 16 per cent.

But recently things have changed. The imperative to reduce carbon emissions has put nuclear power firmly back on the agenda. This has split the green movement – some have come round to the view that it may have to play a role if the UK is to meet its CO2 reduction targets. In October 2010, the UK government gave the go-ahead for eight new nuclear facilities, if suitable sites can be found. Inevitably, huge political battles lie ahead, and the issue of safety will doubtless be hotly debated, as will the conundrum of what to do with the waste the plants produce.

Essentially, nuclear waste is fuel after it has been used in a nuclear reactor. Before being used it mostly consists of uranium, oxygen and steel. However, after use it is dangerously radioactive. Even a few minutes spent in close proximity to it can result in radiation sickness and, ultimately, death. Over a lifetime, a nuclear reactor from the UK's older generation, would produce between 100 and 1,000 cubic metres of such waste, depending on its size, though a power station built today would produce only a tenth of that figure.

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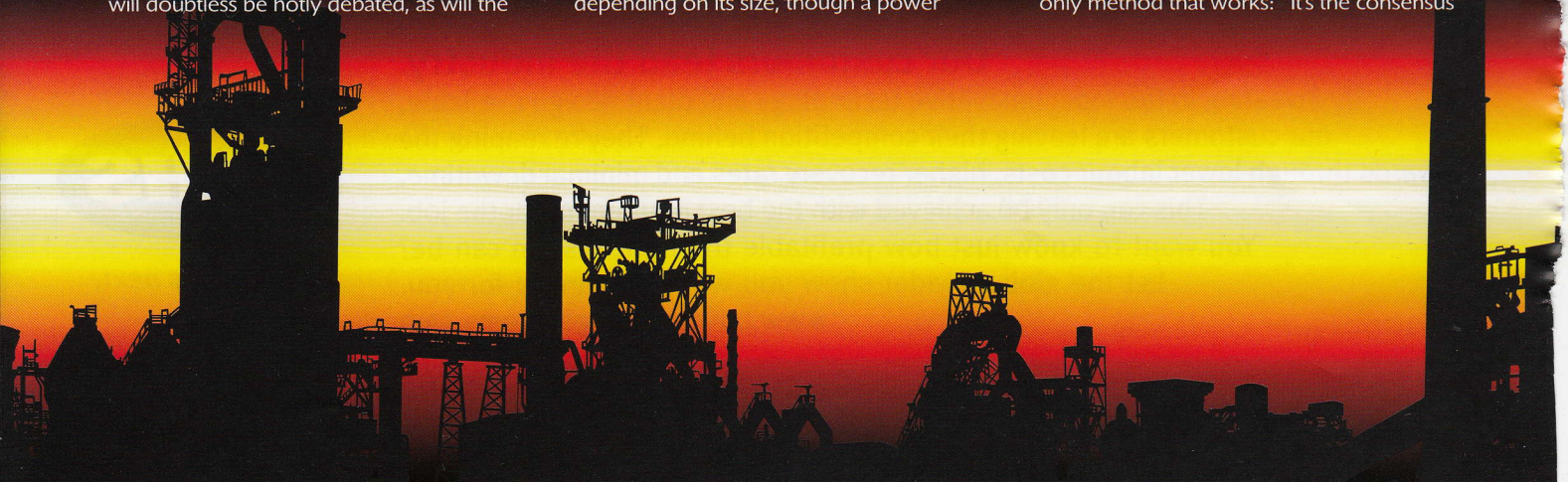
Nuclear waste is categorised as either low level, intermediate or high level, based on its heat and radioactivity. Most of the UK's low-level waste (which accounts for 90 per cent of the total) is stored at Drigg in Cumbria in thousands of steel containers. But for intermediate and high level waste, the body responsible, the Nuclear Decommissioning Authority (NDA), decided that what it calls 'geological disposal' – in other words, burying it deep beneath the ground – is the safest way to manage it.

Other options were explored. Back in 2001 the government set up the Committee on Radioactive Waste Management (CoRWM) to examine this very question. "They looked at everything", says Alun Ellis, Engineering Director for Geological Disposal Facility at the NDA. "From fairly whacky ideas like using rockets to blast waste into the sun or putting it into orbit around the Earth to deep-sea disposal. They adjudged that deep geological disposal was the one that imposed the least burden on future generations."

CoRWM also concluded that geological disposal sites should be decided by 'voluntarism' – in other words by hoping that communities will come forward and present themselves as hosts. Ellis insists that it is the only method that works: "It's the consensus



among countries managing radioactive waste. In practice it's the only thing that works." He cites the elongated political battle over Yucca Mountain in Nevada, where the local community is being forced to store nuclear waste because of a bill passed by the US Congress, as an example of what happens when voluntarism is discarded.

At present there are three communities in West Cumbria that are in discussions with the NDA about whether to become disposal sites. But what happens if those communities suddenly get cold feet? "The back-up plan is that we'd carry on managing it in safe secure interim storage", explains Ellis. "If we have to wait another 10 years to get another disposal facility then that's ok. We can do that and there are no cliff edges."

Mike Childs, Head of Science Policy and Research at Friends of the Earth, believes that the NDA should find the right location first before strong-arming the people of West Cumbria. "The reason they want it in Cumbria is because it's a nuclear industry stronghold – it's not surprising that it's the only area that is still considering volunteering itself. But that doesn't mean that Cumbria has the best geology in the country for a nuclear waste dump. In fact, London clay is probably one of the more stable geological settings for it, but I don't see Boris Johnson volunteering to have a nuclear waste dump there."

Yet the problem does need to be faced soon. Sellafield (where 70 per cent of the UK's total nuclear waste either arises or is reprocessed) is due to be decommissioned over the next decade and the National Audit Office recently published a report that condemned the operator of the plant for failing to develop a long-term plan for the site. It described nuclear waste being stored in run-down buildings at the site as an 'intolerable risk' to public health.

Ellis admits that the present situation is not acceptable. "They are right to be critical. To be blunt, the condition of some of the historic waste facilities at Sellafield, which go back to the '40s and '50s, are not things that we should be tolerating.

> "Future generations will undoubtedly have to pick up the tab for nuclear waste"

"But at least part of the reason why these facilities are in this unacceptable state is because they weren't managed historically. A lot of the waste came out of the defence part of this industry when there was an imperative to get a British bomb. It's not an excuse for the way some of these facilities were designed and operated, but it is an explanation."

Aside from safety, the nuclear industry also gets criticised for the hidden subsidies it receives from the taxpayer – one of the most significant being the cost of managing its own waste. "Effectively nuclear waste operators are managing their waste on the cheap", says Childs. "Nuclear operators pay money into a pot effectively, and that pot of money is meant to pay for the management of the waste. But nuclear waste lasts for thousands of years and there's no way that that pot of money will last that long. Future generations will undoubtedly have to pick up the tab."

Then there is the cost of clearing up after (God forbid) a major accident. "If there was an accident, their liability is capped, although the government is talking about moving that liability up to about £1 billion. As you can see from Fukushima, the costs are a lot higher than that, so in effect by capping their liability, nuclear operators only need to go out to the insurance market to secure cover up to that cap. If an accident does happen and it exceeds the cap, then the taxpayer picks up the cost."

Friends of the Earth argues that the UK does not need a new generation of nuclear facilities. Yet whether or not those eight new reactors are eventually built, with a previous generation of nuclear facilities entering their final decades, we still need to decide how exactly we are going to deal with the dangerous waste they've built up during their lifetimes. One way or another it's a mess that has to be cleared.