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Why rush to spread radioactivity?

Walter C Patterson thinks the dismantling of the Windscale AGR is a dangerous experiment, a 'public relations sideshow' which fails to address the real issues of decommissioning.

Complete the saying: 'What goes up ...' Right: '... must come down'. Note, 'must'. It's certainly true of gravity: is it likewise true of nuclear plants? The nuclear industry answers unhesitatingly in the affirmative: nuclear plants that went up must, in due course, come down. Getting them down is called 'decommissioning'. While the industry was putting the plants up, decommissioning, like other aspects of nuclear waste disposal, was taken essentially for granted. Those designing and building the plants were concerned to ensure that they stayed up long enough, not that they'd be easy to take down again.

In recent years, however, nuclear policymakers around the world have begun to realise that their original nuclear plants are coming to the end of their working lives. Something will certainly have to be done about defunct plants. The question is, what?

As usual, Britain's nuclear managers are plunging ahead without, apparently, pausing to ask whether their plans really make sense. They embarked on the 15-year project to dismantle the small Windscale Advanced Gas-cooled Reactor (WAGR) and restore the site to a green field (estimated cost £45 million, of which half will be borne by taxpayers and half by electricity users) before a host of basic questions had been addressed, much less answered.

A gas-cooled reactor, like Britain's Magnox and AGR units, including the WAGR, consists essentially of a huge block of graphite, surrounded by an even larger shell of reinforced concrete shielding. Both the graphite and the concrete are slightly radioactive. When the station is closed down, this core structure becomes, by definition, radioactive waste. In its original configuration, it is more compact than it could ever be after being cut up into bits. Moreover, it was designed to confine radioactivity within it.

Cutting up this solid core - as the industry plans at present - will create large quantities of dust and liquids, all slightly radioactive. It will mobilise radioactivity that would otherwise be trapped within the solid structure, and expose workers to radiation that would otherwise remain within the shielding. The fragments must then be 'packaged' into some new shielding material, and be removed to a previously uncontaminated location. This disposal procedure will not eliminate or shut off the radioactivity, merely redistribute it, diluting and dispersing it so that it becomes much harder to keep track of.

As yet, no disposal location for low-level decommissioning wastes has been designated; on the contrary, the Government has indicated that none is likely to be established this century. Why, then, the rush to cut up the WAGR, if it will then have to be left lying in packages on the same site? Of course, accumulating such packages will apply pressure on the Government to designate a disposal site. Consider,

however, one of the alternatives. The physical bulk of the reactors themselves constitutes the majority of low-level solid wastes arising from the operation of a gas-cooled nuclear power station. The wastes produced during operation, even for more than two decades, are by comparison of modest volume, especially if compacted or incinerated. Why not designate the station itself, once closed down, as a de facto low-level waste site? The undamaged reactor cores would be more compact than any cut-up fragments, and - with concrete closures in penetrations - at least as well shielded. The site is already contaminated, and known as a nuclear site; why not leave it that way? All the technical and radiological problems of cutting up and packaging will thereby be avoided, along with the necessity to then move the radioactivity to some other, as yet unknown, location.

A corollary of such an arrangement would be to eliminate the need for any separate low-level waste repository. Low-level operating wastes can be packaged as they are already, and stored at the station site, as part of the inventory to be left when the station is converted into a waste site. This does not, of course, address the question of the intensely radioactive spent fuel; but it leaves the spent fuel problem as a separate issue, instead of confusing it unnecessarily with that of defunct stations themselves.

The Atomic Energy Authority argues that the purpose of the WAGR project is to acquire experience of decommissioning, both for Britain's electricity boards and for possible foreign contracts. For such purposes, the choice of the WAGR as first candidate for decommissioning practice is at best idiosyncratic. The structure of an AGR is markedly different to that of a Magnox reactor, and utterly different from those of the water-cooled reactors most common elsewhere. The WAGR experience can, therefore be at most general, rather than specific. It will be of limited application to, say, Calder Hall, Chapelcross, Berkeley or Bradwell, and even less relevant to pressurised water and boiling water reactors.

That being so, why choose to raze an intact reactor down to a greenfield site immediately adjoining the most concentrated accumulation of radioactive decrepitude in the whole of Britain? If the UKAEA is just looking for general practice in dismantling and demolishing radioactive plant, why not start with the egregious mess next door, at Sellafield? If any reactors qualify for genuine and necessary decommissioning at an early date, surely the Windscale Number One and Number Two plutonium production reactors do. They will have been sitting there, entombed and deteriorating, for 30 years this coming October. Their massive stacks, looming over the rest of the site, are showing signs of evident degeneration; in the case of the stacks, what went up may well come down of its own accord unless something is done.

The old decanning plant in building 30 is an open sore, with its contaminated pond and shabby fabric. Building 204, the first reprocessing plant, is even older; indeed British Nuclear Fuels argued a decade ago at the Windscale inquiry that it was already too old to be reopened. Its towering, contaminated hulk is topped by a stack as tall as those of the plutonium piles. Decommissioning these facilities will be not only genuinely necessary but a real challenge. The WAGR decommissioning project, by comparison, is at best a public relations sideshow.

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