

They are not diehard greenies but these geophysicists have such serious reservations about a proposed nuclear waste dump that they have published a book on the subject, writes **Janet Spicer**

'Leaks will appear sooner rather than later'



'Waste has to somewhere, but . . .' Dr Stuart Haszeldine and Professor David Smythe don't back Sellafield

PREDICTING the future is never an exact science, but the educated guess can play a crucial role when it comes to dumping nuclear waste. A book published yesterday raises worrying questions regarding the safety of a proposed nuclear waste dump.

The book's editors, Professor Dave Smythe and Dr Stuart Haszeldine, say that radioactive waste could leak in as little as a few hundred years rather than the millions claimed by UK Nirex Ltd.

The scientific evidence has been scrutinised in the longest planning permission appeal of its kind in Britain.

Nirex, a private company responsible for disposing of Britain's nuclear waste, had applied to build an underground research facility at Sellafield, with a view to dumping intermediate and low-grade radioactive waste at the same site. It predicted that waste would not leak out for millions of years and when it did it would emerge under the Irish Sea. Planning permission was refused, even for the first stage — the underground research facility — but Nirex appealed and sunk £10m into its case.

In their university-published book, *Radioactive Waste Disposal at Sellafield, UK*, Smythe and Haszeldine, geophysicists at the University of Glasgow, have documented the case against the dump. And although Friends of the Earth and Greenpeace have

supported them, the two scientists are not diehard greenies.

"The waste has to go somewhere," concedes Smythe. "I was initially in favour of Sellafield, especially since the alternative was Dounreay."

Dumping at Dounreay could mean 20 trains of nuclear waste travelling through Scotland every day. "If the geology were right, Sellafield would be an acceptable site since it creates

most of the waste. Radioactive material could go directly underground to the dump and never leave the plant. Unfortunately, the geology is nothing like right. From a geological point of view, we think a worse site could not have been chosen."

Sellafield is in West Cumbria, a region that built its wealth on iron ore (or rust). The dump would be therefore in a highly oxidising environment — just

the kind of place to encourage leakage of radioactive uranium isotopes. The power station is built on sandstone under which is the volcanic rock where Nirex wants to store nuclear waste.

The company accepts that radiation will leak; the question is — how long will it take to reach the surface and where will it emerge? The type and current state of the rock layers are important factors in forecasting

what is likely to occur, combined in a mathematical model with assumptions about future conditions.

Rain-water falls over the higher ground in the Lake District, seeps into the bedrock, and flows very slowly west. This water is likely to absorb radioactive leakage from the dump and carry the waste with it as it moves. According to Nirex's report, water containing

radioactive material will stay down in the rock and flow west, not emerging for at least a million years, when it will finally appear under the Irish Sea.

"There is a spanner in the works," says Smythe. "The geology of the area is more complex than Nirex says. We have used their own data, but been more realistic in how we have modelled the future."

The area is criss-crossed with

faults in the rocks — cracks penetrating the rock layers up to the surface. According to Nirex's predictions, the water will simply flow past these faults; but Smythe thinks that unlikely.

Underground water is pressurised because it is flowing down from the mountains of the Lake District, a situation rather like water flowing in pipes from a tank in the roof. The faults provide a release, like a crack in a pipe, allowing water to spout back up to the surface.

Haszeldine predicts that radioactive waste will take the shortcut back up the faults and reach the surface in *hundreds* of years' time and could emerge, not under the Irish Sea, but on mainland Britain.

Constructing an underground research facility may exacerbate problems. Nirex plans to sink two five-metre-wide shafts into the volcanic rock. This is the equivalent of digging into the water main. It could open up even more escape routes for radioactive waste, which Nirex simply does not know how to plug.

"At the appeal, we argued on scientific grounds only and on that basis I think we won hands down," says Professor Smythe. "If Nirex went ahead, Britain would be the only country to build a research facility on the same site as the final dump."

"Nobody else has done it for a very sound reason — it could ruin the final site permanently."