OPEN FILE HIGHLIGHTS THE MENACE OF RADIOACTIVE DU

ALARMS RING OVER N-WASTE

OPEN FILE

ROBIN McKIE and **MARK NEWHAM** report on plans to bury highly toxic debris on the seabed

A FRESH attempt will be made this week to tackle a menace that has been steadily growing throughout Britain for the past 30 years.

On Tuesday, nuclear engineers will meet in Oxford in an attempt to pinpoint new ways of dealing with the mounting dumps of radioactive waste that have been accumulating round the country, the product of UK atomic reactors.

The problem is fast becoming a crisis, say the nuclear industry's many opponents. Privately, some senior managers in the industry agree. Nuclear waste disposal in Britain is in a grim state, they concede.

Tens of thousands of cubic feet of intensely radioactive waste, highly toxic debris that will still be active in 25,000 years, have already been produced in Britain. In addition, thousands of tons of less intensely radioactive materials now await disposal.

Nuclear waste poses a serious environmental hazard. However, plans to get rid of it on land, by burying it, have been continually thwarted by local opposition.

Now, engineers are pinning their hopes on dumping nuclear waste in the seabed round the coast of Britain, particularly near Sellafield and Dounreay, and possibly in other parts of the world.

The idea — like most others concerned with the nuclear industry — is controversial. Other nations, such as Ireland, who might be recipients of unwelcome nuclear waste on their shores look askance at the scheme.

The idea is also anathema to environmentalists. 'Of course something must be done with the nuclear waste that has already been produced,' said Kerry Chester of Friends of the Earth.

'However, until the technology for placing it in the seabed has been shown to be completely feasible and watertight, we cannot start putting it where it is difficult to monitor or retrieve.'

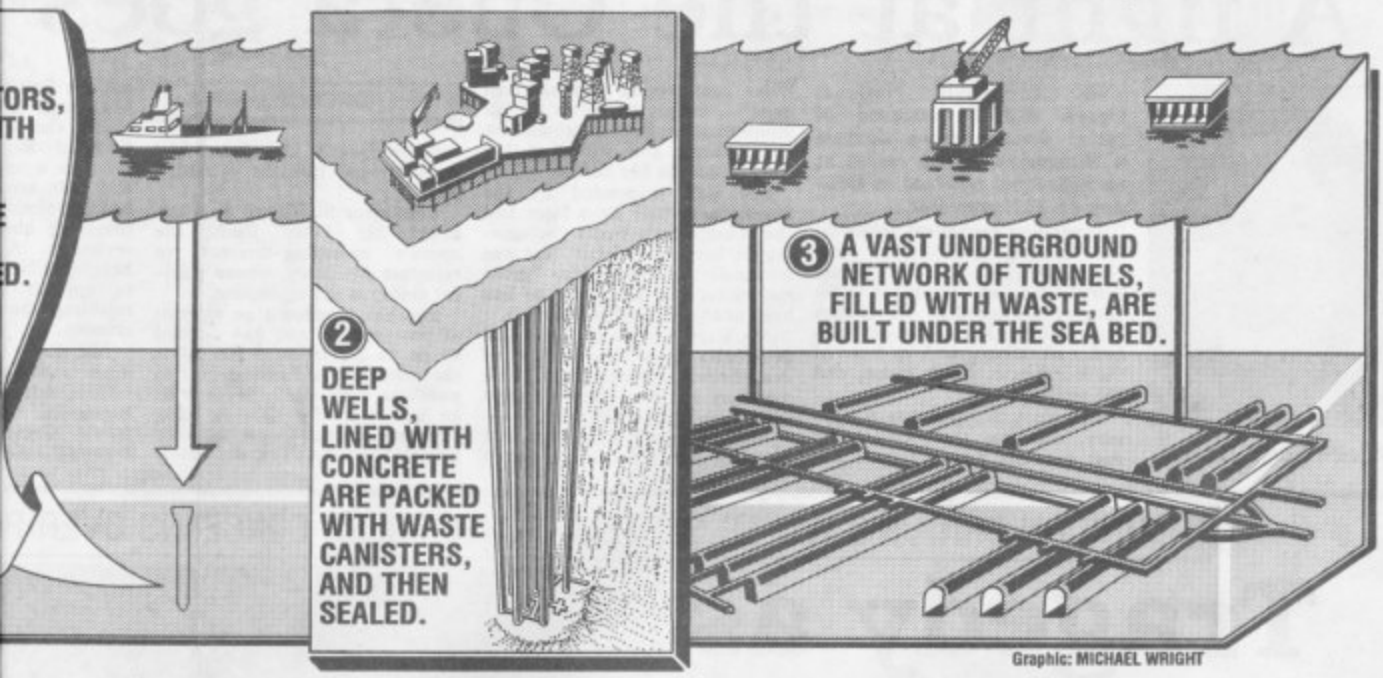
Not surprisingly, the nuclear industry does not agree. It points to one study to be presented at Tuesday and Wednesday's International Conference on 'The Disposal of Radioactive Waste in Seabed Sediments'.

The paper, put together by a group of research agencies on behalf of the EC concludes that seabed disposal is 'radiologically a very safe option'.

'We do not expect that further research can drastically modify our results,' the study adds. 'Subsea disposal of high-level waste can be considered a realistic option.' A study by the National Radiological Protection Board backs this claim.

However, one far more worrying question remains. Why has Britain taken no

MPS — A PROBLEM THAT WON'T GO AWAY FOR ANOTHER 25,000 YEARS



Graphic: MICHAEL WRIGHT

THE ALTERNATIVES

THREE different schemes are being considered by engineers for dumping nuclear waste in the seabed.

1. The first plan, the penetrator project, would involve the construction of 28ft long 'rockets', each containing five canisters of highly radioactive nuclear waste. The penetrators would be dropped, or fired downwards, towards the seabed so that they became embedded there. It would cost about £27,000 to get rid of each canister, each containing about five cubic feet of high-level waste.

2. The second scheme, the borehole plan, would exploit North Sea oil technology to drill deep wells in the seabed. These would be lined with a special casing before canisters were carefully lowered into them. It would cost £66,000 to place each canister in such boreholes.

3. The last project, the repository, would be primarily used for storing some of the less radioactive wastes. A vast network of underground caverns would be created under the seabed, costing about £5 billion.

firm action on nuclear waste disposal three decades after it helped pioneer nuclear power?

It is more than a decade ago since a commission on environmental pollution, chaired by Lord Flowers, warned: 'We think that quite inadequate attention has been given to the matter [of nuclear waste disposal] and we find this more surprising in view of the large nuclear programmes that are envisaged for the coming decades.'

For 10 years no successful action has been to deal with the problem of nuclear waste. At the same time, dumps have been growing, mainly at atomic power stations where cooling ponds of water are today filled with crates of spent fuel rods from Magnox and advanced gas-cooled reactors.

In addition, reactors themselves have been ageing, approaching the day when they must be dismantled and homes found for their highly radioactive components.

'The trouble is that there have been so many political changes regarding the nuclear industry that nobody now has a clear idea what policy should be adopted on waste disposal,' added nuclear analyst Walt Patterson.

'At the same time, stockpiles of the stuff are growing all the time.'

One particular problem involves the reprocessing of high — level wastes, a task from a reactor and reprocessed at Sellafield, a total of 62 cubic feet of high-level, 1,000 cubic feet of intermediate, and 15,000 cubic feet of low-level wastes are created.

And in the case of the high-level waste, this comes in the form of an intensely radioactive liquid that is particularly difficult to handle.

Yet all this waste is produced to extract plutonium that has only two possible uses: as fuel for Britain's now moribund fast breeder reactor programme — and for nuclear warheads.

For its part, the nuclear industry has not been short of ideas. Unfortunately, almost every move it has made has been thwarted by a public that year by year seems to grow increasingly hostile to the concept of atomic power.

Repeatedly, the official nuclear waste disposal agency Nirex has been blocked by protesters as it has investigated sites for burying waste — despite protestations by director Maurice Ginniff that such schemes fall into three basic categories — penetrators, boreholes and repositories. The first two are designed to deal with high level waste, the last with low and intermediate.

In the case of the repository, a service life of 50 years is envisaged. Drilled into hard rock, a maze of 60-ft-high caverns that could house 200 million cubic feet of waste would be created under the seabed, a task equivalent to constructing the Channel tunnel.

According to Harold Beale, technical manager at Nirex, the price of such a subsea repository would be 'three to four times that of a repository on land', an extra cost that would be borne by the electricity consumer.

As for the other schemes, the technology exists or can be developed, say engineers, the obvious problems being risk of accidents or sabotage during container transport.

There are other areas of worry, however. The prospect of 'torpedos' of highly toxic nuclear waste going astray horrifies many people while 'concern' has been expressed by some engineers, scheduled to attend Tuesday's conference, about the ability of boreholes and waste canisters to withstand corrosion and underwater pressures.

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One particular problem involves the reprocessing of high — level wastes, a task currently carried out at Sellafield.

Reprocessing is done to remove plutonium from spent fuel, a procedure that only intensifies the production of nuclear debris. For every 100 cubic feet of spent fuel that are removed from a reactor and reprocessed at Sellafield, a total of 62 cubic feet of high-level, 1,000 cubic feet of intermediate, and 15,000 cubic feet of low-level wastes are created.

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For its part, the nuclear industry has not been short of ideas. Unfortunately, almost every move it has made has been thwarted by a public that year by year seems to grow increasingly hostile to the concept of atomic power.

Repeatedly, the official nuclear waste disposal agency Nirex has been blocked by protesters as it has investigated sites for burying waste — despite protestations by director Maurice Ginniff that such disposal is 'environmentally sound and socially responsible'. As a result, nuclear engineers have turned beyond Britain's shores for a solution. The most promising of these ideas will be discussed on Tuesday.

Essentially, seabed schemes fall into three basic categories — penetrators, boreholes and repositories. The first two are designed to deal with high level waste, the last with low and intermediate.

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In general, the price of seabed disposal appears to be high but bearable — the political cost, however, remains unknown.

All that is really needed is an acknowledgement by government and country that something must be done about nuclear waste —quickly.

THE ALTERNATIVES

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THREE DEGREES OF PERIL

INSIDE a reactor, nuclear fuel undergoes remarkable changes. Its uranium breaks down, and apart from releasing energy it produces many different by-products as waste, such as strontium, caesium and krypton. Many of these substances are intensely radioactive.

Waste comes in three categories: high, intermediate and low level.

■ High-level wastes are the most intensely radioactive and can take several thousand years to decay. One of these, plutonium, among the most toxic substances on earth, takes 25,000 years for its radioactivity to fall to half its current level. Spent fuel rods and waste from reprocessing plants are the main components of this group. The heat generated by radioactive decay means that constant cooling is essential.

■ Intermediate wastes are less radioactive and include contaminated reactor parts, diluted waste from reprocessing plants and used radioisotopes.

■ Low-level wastes are only mildly radioactive and do not need shielding, unlike the more active wastes. Contaminated clothing, equipment and much medical waste fall into this category. Most nuclear waste is of the low-level variety.

£8m energy study 'can't be relied on'

by MARK NEWHAM

ACCUSATIONS of bias and unreliability are being levelled at one of the world's most influential energy policy documents, widely used in justifying vast expenditure on international nuclear energy research and development.

The document in question—a weighty tome of more than 1,000 pages is called 'Energy In a Finite World.' It was the result of seven years work by 120 scientists who put 225 man years of research to produce the study in 1981 for a Vienna-based international think-tank called the International Institute for Applied Systems Analysis (IIASA).

Government energy planning authorities on both sides of the Iron Curtain, including Britain, have used the £8 million study in drawing up policies stressing the importance of developing fast-breeder nuclear reactors—one of the primary conclusions drawn by the IIASA energy team.

Few of these authorities apeared to have checked the study thoroughly before accepting the findings and it fell to an American IIASA research scholar mulling over the computer models incorporated in 'Energy in a Finite World' to stumble on major discrepancies in the data.

Dr Bill Keepin decided that the errors were worrying enough, in view of the wide acceptance and use of the study, to warrant an 18-month investigation of the document's data and presentation. His conclusions, checked and approved by scientists, including experts at the US Office of Technology Assessment, reveal that the document is 'not scientifically justified' and 'cannot be relied upon by policy makers seeking a genuine understanding of the energy choices for tomorrow.'

Keepin argues that, since the document's 'final outputs are nearly identical to their inputs, which are arbitrary, unsubstantiated assumptions' the conclusions have been made to fit the bias of [illegible] world nuclear energy programme based on existing nuclear fission (light-water reactor) technology will drain world uranium resources in 25 years.

The fast reactor not only uses plutonium reprocessed from nuclear waste but has the capability to 'breed' more plutonium. Plutonium has an immensely high radioactivity rating and its disposal creates vast environmental problems.

Keepin's investigations of the computer models used for 'Energy In a Finite World' reveal that small changes in the assumptions radically delay the time when fast reactors will become necessary. And the world must complete one light-water reactor every five days for the next 50 years if the amount of nuclear electricity (with its associated rapid uranium depletion rate) predicted to come into use by the IIASA researchers is to be realised.

It is largely because of such extraordinary conclusions that Keepin is now warning energy policy-makers to disregard the sections of the document dealing with nuclear energy.

His warnings may have come too late. Already the study has helped design energy programmes throughout the world — including those of the United States, Russia, Britain.

Throughout the preparation of the document, say Keepin and his colleagues, Hafele exerted pressure on the research team to follow his own line of reasoning. A number of scientists involved quit IIASA in disgust at Hafele's handling of their work.

The blame for any failings in the study lies with Dr Hafele, says Keepin. And, he adds, it is no secret that Hafele was firmly committed to fast-reactor development before the IIASA work started.

Dr Hafele is preparing a detailed rebuttal of Keepin's report which is expected to be published early next year in the journal *Policy Sciences*.

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Keepin argues that, since the document's 'final outputs are nearly identical to their inputs, which are arbitrary, unsubstantiated assumptions' the conclusions have been made to fit the bias of researchers who originally mapped out the study's framework. Such a practice, says Keepin, is disgraceful, considering the influence the report was designed to have on world energy planning.

'Energy in a Finite World' suggests fast-reactor research and development should proceed to the point of commercial viability as soon as possible on the grounds that an expanding world nuclear energy programme based on existing nuclear fission (light-water reactor) technology will drain world uranium resources in 25 years.

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In Britain, the Atomic Energy Authority has already spent £1,100 million on fast reactors and is providing £100 million a year for fast reactor research. In 1986/87, Britain will start collaboration with West Germany, France, Italy and Belgium to develop a joint design of fast reactor and the plan is to install three lead reactors (bigger than a prototype but not a fully commercial design), one each in the UK, West Germany and France during the 1990s.

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No. 52777. April 16, 1988

Mark Newham reports that charges of genocide are being levelled against Iraqi President Saddam Hussein by opponents of his regime. (900 words)

GENOCIDE CHARGE AGAINST IRAQ

MARK NEWHAM LONDON, APRIL 16

Iraq's President Saddam Hussein has been accused of embarking on a policy of wiping out all internal opposition to his regime 'by fair means or foul'. The policy, say his opponents, is being applied to armed opponents and civilians alike and the inhabitants of whole towns in areas opposed to Hussein have been killed or forced to flee.

According to members of the Kurdish separatist movement- the Patrotic Union of Kurdistan (PUK) - Iraq is not only using chemical weapons indiscriminately against the Kurdish people but the security forces have started an insidious campaign of using infiltrators to poison whole families of PUK activists.

This disclosure came to light recently when three top opponents of the Hussein regime - including PUK military commander Mustafa Qader Mahmoud - were poisoned by a Mata Hari type insurgent in Kurdistan and were subsequently flown to Britain for treatment.

According to Mr Mahmoud, 10 people dining in a private house in the town of Marga were poisoned and three, including his 60-year-old mother, died within hours of eating a specialist Kurdish yoghurt dish.

(SEE Kurds 2...

The others - one of whom was Mr Mahmoud's 14-year-old niece - were taken to Tehran for treatment and three of the worst affected survivors, including Mr Mahmoud, were brought to London by Amnesty International for further treatment.

Until now, Mr Mahmoud has been reluctant to talk openly about the affair hoping his silence would prompt the government to release his wife and two-year-old son who have been held in prison for the past nine months. But with no sign of their release in sight, Mr Mahmoud has now virtually given up hope of ever seeing them again and agreed to talk to the Observer this week at his secret London address.

'What Saddam Hussein is doing in Kurdistan cannot be compared with the Pol Pot genocide in Kampuchea', said Mr Mahmoud. 'It is worse than that, Pol Pot didn't use chemical weapons.'

'Whole towns and villages are being destroyed and those who survive had to flee to neighbouring towns which are overflowing with refugees.' In Sulaimaniya, for example - a Kurdish town in north-east Iraq - Mr Mahmoud knows of a number of cases where more than 100 people are having to share one three bedroom house. These people have been forced to leave rural areas by incessant attacks on them by Iraqi forces using chemical weapons.

(SEE Kurds 3...

'When they can't get to us in the PUK by outright attack, they send in infiltrators to poison our families. The agent they sent to get us was the wife of a jailed PUK fighter who carried out the mission in the hope of having her husband released. He's still in jail and the woman, Narmeen Hawaiz, is in a heavily guarded government safe house in Sulaimaniya.'

According to Mr Mahmoud, the woman infiltrated the PUK by offering help to Mr Mahmoud while his wife was in jail. On the day of the poisoning she prepared the food and was the only one to escape the effects of the poison - a lethal, tasteless, colourless, heavy metal chemical called thallium which is still used in rat poison in some countries despite having been banned as a component of pesticides by the World Health Organisation.

Mr Mahmoud believes that the poison killed only those with a low resistance to it and those who ate the later portions of yoghurt where the thallium was most highly concentrated. According to Dr John Henry of the London-based National Poisons Unit who treated the three poisoned Kurds in London, just one gramme of the substance, an amount which would only just cover the average person's fingernail - is enough to kill. The only known antidote is Prussian Blue (now known as Berlin Blue) taken in large quantity to absorb the poison in the body.

(SEE Kurds 4...

The poison itself attacks the body's nervous system causing severe physical debilitation, mental disorientation and complete hair loss. After several weeks treatment, two of the Kurds brought to London have recovered sufficiently to leave the country but Mr Mahmoud, affected more severely than the others, is still unable to walk without support and is visibly wasted. His niece, still in a Tehran hospital, is paralysed from the waist down and doctors are unsure if she will ever walk again.

Investigations by the Observer have revealed that thallium is in widespread use within the scientific community and can be obtained from several chemical supply companies in Britain, Europe,m USA and elsewhere. Thallium is still used in some rat poisons - mainly those used in Third World countries, is used in the preparations of lenses and, in recent weeks, the Japanese have announced great advances in superconductive materials incorporating small amounts of the substance.

Although the directory of world chemical producers only lists five manufacturers of the chemical - two each in the US and Belgium and one in West Germany - further investigations have revealed that it is also produced by an Iraqi organisation called the Abu Haitham centre in Baghdad. However, the mineral from which the thallium is derived is only found in three countries - Sweden, Switzerland and Greece.

(SEE Kurds 5...

According to Amnesty International, there have been 40 recent cases of Kurds opposed to Iraq's government being poisoned with thallium. Amnesty also says that within the past three years it has received reports of Iraqi security forces systematically torturing and summarily executing opponents of the Hussein regime. All Amnesty's appeals to the Iraqi government for investigations into the reports have been ignored and Iraq's ambassador to Britain has called the allegations 'false' and 'bizarre.' -

END