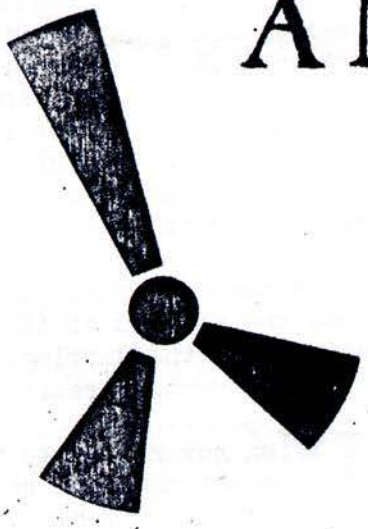

ANC WASTE DUMPING NEWSLETTER

no 10 + 11 AUGUST 1982

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SORRY, this newsletter is very late, and thus becomes Nos 10 & 11. There just wasn't enough to send out as No. 10, and then it all came in a rush...

Dump case goes ahead

From Martin Cleaver in Amsterdam

The British Atomic Energy Authority told an Amsterdam court yesterday it would continue to press for an injunction to prevent Greenpeace harassing ships dumping nuclear waste in the sea. The AEA's lawyer, Mr J. Wuisman, told the court: "My client wants an injunction to prohibit possible Greenpeace actions in the future."

A new hearing was set for September 6.

The authority went to court on August 13 after Greenpeace volunteers boarded the British dumping vessel, Gem, in the Atlantic and chained themselves to unloading platforms. When they voluntarily called off the protest the same day, the court action was shelved.

As the court sat, the Greenpeace ship, Sirius, sailed from Amsterdam to harass Dutch vessels dumping nuclear waste in the Atlantic.

SEA DUMPING OF NUCLEAR WASTES AND ITS EFFECT ON IRELAND A report byHOPE Clean Seas Committee, 1982. £1.00 from HOPE, c/o Boyden, Mill Little, Coomhola, Bantry, Co. Cork. 16pp.
This very well researched and documented report considers the evidence available about the sea dumping of (mainly British) nuclear waste from the point of view of Ireland, a country without either nuclear power stations or nuclear weapons, and thus without the supposed benefits which offset the costs. For the Irish these costs involve a portion of worldwide fall-out, the Irish sea, which Windscale has made the most radioactive in the world, southern shores washed also by waste from Cap la Hague, and western shores and fishing grounds which lie considerably closer to the North Atlantic dumping site than those of any of the dumping nations. The report considers the legal and institutional framework within which dumping is carried out, together with a well considered survey of the oceanographic evidence available, and the use made of it by the authorities, and the affects of the low levels of radiation the Irish people may expect to receive from the dumping. They point out that one of the provisions of the London Dumping Convention calls on 'Contracting Parties' to enter into regional procedures fro pollution prevention and to develop 'harmonised procedures', and call on the Irish government to use the next LDC meeting (in February) put forward objections to current practice and future plans. They would also like to see Irish observers on the dumping ships. This report is probably the best and most complete general gase against sea dumping available, and deserves to be widely read.

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* * *

........SIZEWELL.......SIZEWELL......SIZEWELL........SIZEWELL.......SIZEWELL.................

It appears that no ne of the groups comprising the Sizewell Co-ordinating Cttee are committing themselves to preparing a case about the waste implications of Sizewell B. Although cases covering other issues- safety, proliferation, need, etc are being prepared, waste (which used to be called the "Achilles heel" of the nuclear industry) is being sadly neglected. Many of the groups represented at the Committee (covering most of the opposition except local authorities) have yet to make a decision about participating in the Inquiry, which starts in January, but research continues anyway. It seems entirely possible that CEGB assertions about the waste arising from Sizewell will be unchallenged (either at the Inquiry or in the press) unless some of the 50 or so people reading this newsletter become involved. It would seem sensible to discuss our attitude to the Inquiry at a workshop at the ANC Conference in Sheffield on 5/6th September. ANC will presumably formulate its own policy there, so the discussions will be important. Please try to attend. Those unable to do so are welcome to write to me (Geoff Young, 22 Criffel Avenue, London, SW2. 01-671-6169) if they have any thoughts they want putting to the workshop.

Details of the ANC Conference from ANC National Office, PO Box 216, Sheffield S1. phone X 0742 754691

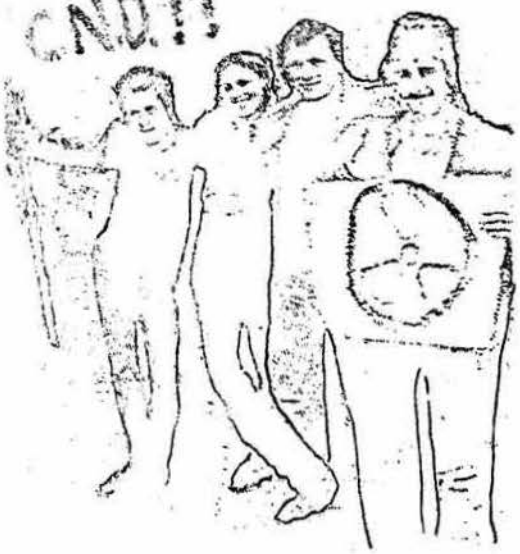
..........STOP PRESS......STOP PRESS.....

GREENPEACE say (26.8.82) that their ship Sirius has left Holland heading towards the N Atlantic dumpsite, to protest about this years Dutch dump. A court in Holland refused to grant the Dutch AEA an injunction to prevent the protest, and indicated that the Greepeace protest was legitimate unless it succeeded in actually preventing the the dumping. Meanwhile the Den Halden council passed a motion that the waste be stored on land, but the Department of Health refused to accept this. Dumping ships from Belgium and Switzerland are also expected at the site this year.

ATOMIC ENERGY SOD CND!!!

DURSLEY (GLOS) GAZETTE 7.8.82

Big police presence, and low key protest as 'Gem' loads



PUTTING the other side was this pro-Atomic Energy group from Gloucester — Amanda Tirel and Tim

A strong police presence, and a pass system for admission to the Docks, kept protesters at bay at Sharpness on Monday. The protests were against the loading of the Motor vessel Gem with nuclear waste ready for dumping 500 miles out into the Atlantic.

In addition to the protestors, who in the past have caused problems at the Docks, there was also a small group of placard waving supporters of the dumping operations.

Normally the Gem is loaded with low level radio active waste at Sharpness in July, but this year the rail strike delayed the operation. This also put a stop to plans for a major demonstration.

When work started on Monday only a few protesters were present from Stroud, the Forest of Dean, and Clevedon. They said their picket was to draw attention to their campaign to get deep sea dumping of nuclear waste stopped.

Two years ago anti-nuclear protestors halted a train carrying nuclear waste and sat on its roof for several hours before police moved in to arrest them. Prior to that protestors had occupied dockside cranes.

This time British Waterways Police and Gloucestershire Police were taking no chances. Early on Monday police were on duty at the main dock entrances checking on visitors and later the top entrance to the dock was effectively sealed off. Other police were also on duty at various locations at the dock to prevent any chance raid.

Sharpness has been used as the port for the removal of nuclear waste since 1970. Mr. Graham Starr of the UK Atomic Energy Authority said the Gem would be loading all week and hopefully would sail at the weekend.

One of Monday's pickets said they were hoping to talk to dockers as they left work to try and persuade them not to handle the radioactive cargo. They had not planned any direct action to interfere with the loading.

A spokesman for the Severnside Nuclear Alliance "We have be aware that we have the suppo sympathy of the people and that protest marches cause resentment

This point wa parently echoed feelings of the dumping supp who said they rather have n power, cheap and dumping. have the count littered with producing windm

Atom waste clash at sea likely

By Harry Debelius
Madrid

Members of the 'Greenpeace' ecological movement, aboard the Sirius, plan to interfere with the dumping of nuclear waste" today by a British ship about 490 miles off the north-western Spanish coast, according to a report published here yesterday.

The Sirius, with 27 people on board, sailed from Amsterdam last Thursday for its expected encounter at the Atlantic dumping ground with the British cargo ship Gem, which is due to jettison 2000 tons of radioactive waste material, packaged in specially prepared drums, into an ocean trough 12,000 feet below the surface.

The foreign affairs committee of the lower House of the Spanish Parliament recently appealed to the Madrid Government to urge British, Belgian, Swiss and Dutch authorities to stop practices which contaminate waters near the Spanish coast.

Last year, the Spanish navy impounded a Greenpeace vessel when it interfered with whaling operations off the north-western Spanish coast.

Following a British court order on July 2 to the British section of Greenpeace, which prohibits the organization from physically impeding the disposal of the waste material, the Dutch section of Greenpeace decided to act,

Atlantic dump licence for nuclear waste

GUARDIAN 24.7.82

By Richard Norton-Taylor

The Ministry of Agriculture, Fisheries and Food has granted a licence to the UK Atomic Energy Authority to dump its annual load of nuclear waste in the North-east Atlantic, 340 miles from the Spanish coast, it was learned yesterday.

The containers, weighing nearly 2,700 tonnes, will be jettisoned from the chartered vessel, MV Gem which is expected to leave Sharpness, on the Severn estuary, for the dumping ground early next month.

Although the UKAEA has dumped low-level radioactive waste in the Atlantic every year since 1949, concern about the activities of opponents led the authority to seek a High Court injunction against any plans they may have had to interfere with the operation.

Mr Justice Sheen last month granted injunctions requested by the Treasury Solicitor on behalf of the UKAEA against Greenpeace companies based in both Britain and the Holland. But while he said that he had jurisdiction over the Dutch-registered ship, Sirius, since a confrontation with the Sirius might endanger British property, he acknowledged that the order would not be enforceable.

The licence by the Ministry of Agriculture, which is responsible for monitoring radioactive waste, is in accordance with the London Dumping Convention. It was granted amid growing controversy started by an internal ministry report which pointed out that Britain accounts for over 90 per cent of all man-made radioactivity known to enter the world's oceans.

And on Thursday, the Government rejected a recommendation in the Flowers report that an independent body should be set up to develop and manage facilities for disposing nuclear waste. Instead the Government has set up its own body under Dr Lewis Roberts, a member of the UKAEA.

The authority is considering whether to invest in a bigger and more modern ship to handle radioactive waste. It is believed to have already decided in principle to order a ship with a carrying capacity of over 4,000 tonnes.

The authority says that the dumping is carried out in accordance with internationally-agreed procedures. It adds that part of the waste is the produce of radioisotopes used for medical and industrial purposes in Britain and throughout the world.

MORE INFO NEEDED

Nuclear waste

Chatham naval base's nuclear complex will become the first in Britain to be stripped of radioactive waste after closure. At Leiston, Suffolk, nine people were arrested after a train carrying waste was halted.

Nuclear controversy, page 3

T.12.8

Chains fail to hold nuclear waste

G.12.8.82

By Paul Brown

Six members of the Greenpeace ecology group remained chained to the dumping platforms of the nuclear waste ship Gem 600 miles off Land's End last night while the crew rigged up a fifth emergency platform and resumed dumping the one-ton barrels over the side.

An attempt to stop the dumping from the fifth platform was thwarted when high-pressure fire hoses were turned on Greenpeace members in rubber boats.

The Greenpeace ship Sirius followed the Gem through Monday night, and at dawn on Tuesday a party of six in rubber boats equipped with chains boarded the Gem without being seen.

The six, including an American woman, are in breach of a High Court injunction and face gaol for contempt if brought back to this country.

The Gem is on an annual charter to the Atomic Energy Authority and was expected to take a week to dump 2,700 barrels of nuclear waste.

The barrels with the waste embedded in concrete, are being sunk in a 3½-mile deep trough in the sea bed.

Mr Hans Giuit, a Dutchman aboard the Sirius, said that dumping had resumed at one barrel every three minutes. "The members of Greenpeace who carried out the boarding are in good heart. They have vowed to remain chained to the dumping platforms until it is stopped."

He said that Greenpeace members using inflatable boats had tried to stop the dumping by getting under the temporary platform but hoses had been turned on them. "Barrels were being dumped in the sea a few feet from us."

A Greenpeace spokesman in London said that the British branch of the organisation had taken no part in the boarding because of the outstanding High Court injunctions.

The Dutch branch had decided to ignore the injunctions because they felt they must continue the protest against the contamination of marine life.

Greenpeace objected to the dumping because nothing was known about its effect. If it turned out to be extremely harmful there was no way of recovering the waste.

The Atomic Energy Authority said last night that the nuclear waste was of low level and the dumping operation was being policed by the European Nuclear Energy Agency. He understood that the captain of the Gem was allowing the Greenpeace members aboard to be fed and clothed by people from the Sirius.

He hoped the dumping would be completed before Saturday.

Atomic body seeks court action to halt protest

G 13.8

By Paul Brown

British nuclear authorities are to seek an injunction in Amsterdam County Court today to try and stop Greenpeace protestors harassing the nuclear waste dumping ship Gem, 600 miles south-west of Lands End.

The United Kingdom Atomic Energy Authority is asking for a £20,000 a day fine for every day that the harassment continues.

Greenpeace, which has six members chained to the decks of Gem, will fight the action. It maintains that the dumping is outside Dutch territorial waters and therefore outside the court's jurisdiction.

Meanwhile, the Greenpeace ship, Sirius, continues to shadow Gem.

Greenpeace members were allowed aboard the ship late on Wednesday to give sleeping bags and clothes to those chained to the decks to stop them suffering exposure.

● Nine anti-nuclear protestors were arrested yesterday after a train was held up at Leiston, Suffolk. They were protesting over the shipment of radio-active waste by rail from the nearby Sizewell power station.

On LBC (Londons news radio station) on 13th August Hans Cuijt alleged that the Captain of the Gem ordered his crew to cut the Greenpeace members loose. They refused, for safety reasons, nad he threatened to have the crew members charged with mutiny. Graham Stacy, AEAxpress person stoutly denied this on the same programme. But when ITN showed pictures of the action (on the 16th) their reporter also referred to the crew refusing to cut them loose, though she said nothing about mutiny. The pictures showed six people chaining themselves, in pairs, to three platforms, each about 12ft square on a very wind- and wave-swept deck. When loading resumed on three others they split up, occupying a platform each, and stayed th for three days, receiving food, radios, etc thrown up from inflatables.

2,700 tonnes were dumped this year, a slight increase on last, but the radioactivity has increased by 59%. The amount of lead shielding used has doubled to 30 tonnes (WISE)

Nuclear waste disposal resumes in Atlantic

Greenpeace chain protest ends after court action

G 14.8

From Martin Cleaver in Amsterdam

The nuclear waste dumping ship Gem resumed work yesterday after protesters from the environment organisation Greenpeace, who had chained themselves to its decks, abandoned their action.

The six demonstrators were chained to the dumping platforms for three days to prevent the vessel dropping its cargo of 2,700 tonnes of low level nuclear waste for the UK Atomic Energy Authority in the Atlantic Ocean, 600 miles south-west of Land's End. The work was to have started on Monday.

The protest ended during a court hearing in Amsterdam, in which the authority sought an injunction to prevent Greenpeace harassing the Gem. The authority asked for an immediate fine of £20,000 per day, but Judge Benjamin Asscher appealed for a halt to the harassment to give him time to consider the issues at length.

Greenpeace agreed and within one and a half hours all protestors had left the Gem and boarded the Greenpeace vessel Sirius, which headed for the French port of Brest, where it is due to dock on Sunday.

The hearing was adjourned for a week for the authority to decide whether to proceed with attempts to have all such future action by Greenpeace declared illegal.

A Greenpeace spokesman said the group was satisfied with the case so far, which had brought plenty of publicity.

Last month a British court ordered Greenpeace to stop trying to impede the dumping, but the group's Dutch section refused to recognise the court's jurisdiction over a foreign organisation in international waters.

A lawyer for Greenpeace said the group favours a Dutch court ruling to establish whether their protest actions are lawful. "Such action is purely demonstrative and does not contravene Dutch law," he said.

The Atomic Energy Authority says the waste was dumped in accordance with treaties signed by Britain and the Netherlands. "We don't want to stop Greenpeace expressing their opinion, but they cannot use illegal means to do so."

Court sources said there was some uncertainty as to the court's competence to rule on a question involving a Dutch ship with a multi-national crew trying to obstruct a British ship in international waters.

Mr Hans Cuijt, Greenpeace's campaign leader aboard the Sirius said: "The campaign has made it clear that the UK AEA can no longer ignore the growing international opposition to the true crime — the use of the oceans as a dustbin for their unwanted waste."

The Sirius will return to Amsterdam for repairs.

In Osaka, Japan, a Greenpeace leader said it would launch a joint protest campaign with Japanese anti-nuclear groups against a planned shipment of Japanese nuclear waste to France for reprocessing.

New executive for nuclear waste

POLLUTION *Times* 23.7

Emphasizing that the Government attached the highest importance to the safe management of radioactive wastes, Mr Tom King, Minister for Local Government and Environment Services, announced in a Commons statement that the Government had reached agreement with the UK Atomic Energy Authority, British Nuclear Fuels Ltd and the generating boards, to set up the Nuclear Industry Radioactive Waste Executive (NIREX).

He explained that this executive organization would develop and manage radioactive waste disposal facilities and accept solid waste from those who created it. In the first instance the executive would take over responsibility, as from next year, for the sea disposal operations for low-level waste.

It would have a staff at Harwell, provided by the UKAEA on a repayment basis, and would be supervised by a directorate made up of senior representatives of the component bodies. The costs of disposal operations, expected to be roughly £65m over the next 10 years, would be met by the producers of the waste.

Mr King said the Government was publishing a White Paper today. It was satisfied that all the wastes currently envisaged could be managed and disposed of in acceptable ways.

The Government believes (he said) that this new executive is the most suitable form of organisation for these present tasks. Its establishment of on way affects the clear responsibilities of the Secretary of State for Environment together with the Secretaries of State for Scotland and Wales. They are responsible for the overall strategy on waste management.

In fisheries and food and the Nuclear Installations Inspectorate they retain the regulatory powers to ensure that the executive maintain the necessary high standards. The new executive will make periodic reports to the Secretaries of State. These reports will be published.

Radioactive wastes vary very widely in radioactivity and toxicity. For the small quantities of high-level heat-generating liquid waste, work is going ahead on vitrification plant. The solid blocks thus produces will the be stored for a period likely to be at least 50 years, until the radioactivity and heat generation have substantially declined.

Meanwhile further research will be undertaken to help identify the most suitable of the available methods for longer-term management.

For intermediate-level waste, there is a need for the early development of land disposal facilities employing existing technology. This will be the first main task of the new Executive.

For low-level wastes, satisfactory methods of disposal are already in use, and the Independent Radioactive Waste Management Advisory Committee have confirmed that these should continue to be used, subject to the continuing monitoring of appropiate controls. In the case of liquid discharges from the Sellafield works of BNFL, which have been substantially reduced in recent years, a new and more stringent authorization will be issued after the treatment plant now under construction comes into operation.

The cost of waste management measures must be met by the industry and be reflected in its accounting practices. The industry has confirmed to me that it fully accepts this. There is need to secure public confidence in the management of both existing radioactive wastes and those that will arise.

As the White Paper confirms, the Government attaches great importance to keeping the public properly informed, and will seek to ensure that this is done at all stages.

Mr Denis Howell, for the Opposition (Birmingham Small Heath, Lab) said the Opposition would be pressing for an independent element to be included in the executive, which would carry the confidence of the public and was vital.

Mr King: He misunderstands the nature of the executive, which is to carry out work and will have to submit any proposals to the Radioactive Waste Advisory Council, the majority of whose members were independent of the nuclear industry. The Government has overall responsibility for the installations and their inspectorate.

Mr Nigel Forman (Sutton, Carshalton, C): What will be the impact on the price of electricity of these arrangements, since it is the industry which will have to bear the costs?

Mr King: I understand there will not be a significant additional cost factor.

SEE ALSO F.T. 23.2.82, WHICH CODE NAMES THE NEW ORGANISATION "NIREX"

Nuclear watchdog plans vetoed by Government

By Andrew Veitch

The Government has rejected the recommendation in the Flowers Report that an independent body should be set up to develop and manage facilities for disposing radioactive nuclear waste.

A White Paper published yesterday, said that the nuclear industry, with the agreement of ministers, has already set up its own Nuclear Industry Radioactive Waste Executive.

The committee, chaired by Dr Lewis Roberts, a member of UKAEA and director of Harwell, includes representatives from British Nuclear Fuels, the UK Atomic Energy Authority, and the electricity generating boards. Its first task will be to dispose of 35,000 cubic metres of medium level nuclear waste which has accumulated since the nuclear programme began.

By the end of the century there will be at least 70,000 cubic metres of medium-level waste, enough to cover two football pitches to a depth of seven metres, and the executive plans to bury it at two sites. One will be a trench, 20 to 30 metres deep, on a site of up to 100 acres. The other will be a modified mine or purpose built cavity, between 300 and 500 metres deep.

The search for suitable sites has already began: the trench will probably be in clay and the deeper cavity might be hacked out of rock. The executive plans to complete one of the facilities by the end of the decade.

Low-level waste, amounting to some 20,000 cubic metres a year, will continue to be dumped in the Atlantic, 500 miles south-west of Land's End, and in the trench at Drigg in Cumbria which is owned and operated by British Nuclear Fuels. The executive will look for a second site for low level waste.

The cost of disposing of medium and low level waste is expected to total £65 million over the next decade, and will be met by the producers of the waste.

The executive will not be responsible for disposing high-level, heat-generating waste. About 1,000 cubic metres is stored in liquid form in stainless steel tanks at Sellafield, and it will remain in the care of British Nuclear Fuels.

The Government has decided that the most cost-effective method of disposing of this waste is to convert into glass blocks. It will be stored on the surface for [illegible] allow it to cool down, and will then be buried under the ground or beneath the ocean.

British Nuclear Fuels has received planning permission for a £150 million plant at Sellafield which would convert the waste into glass blocks. It is due to come into operation in 1987.

Mr Tom King, the Local Government Minister, stressed yesterday that environment and agriculture ministers, as well as the Nuclear Installations Inspectorate, would keep their responsibilities and powers. The new executive would report periodically to Mr Michael Heseltine, Environment Secretary, and the reports would be published. Plans for disposal sites would be subject to ministerial approval, and public inquiries if necessary.

Mr King added: "There are already in existence quantities of radioactive wastes. The Government attaches the highest importance to the management of these, together with that of other wastes in the future. The proposals in the White Paper mark further steps towards securing this in recognition of the responsibility that we have to ensure the safety of the environment and the proper protection of the public."

Sir Derys Wilkinson, chairman of the Government's Radioactive Waste Management Advisory Committee, welcomed the new executive, which he said would be subject to "stringent statutory safeguards."

The White Paper agrees that when Flowers proposed an independent body it had in mind facilities for the disposal of high-level heat-generating waste. This waste is not now considered to be an immediate issue.

Radioactive Waste Management, Cmnd 8607, HMSO, price £2.70.

mah

UK scientists map sea floor

Lloyds List 6.4.82

BRITISH scientists, using a long range sidescan sonar, have now mapped a little over 1% of the world ocean floor with nearly a quarter of the data obtained on a single six-monthmvoyage just completed by the Hull-based freezer trawler *Farnella*.

The vessel was on a scientific charter to the Natural Environment Research Council to carry the Institute of Oceanographic Sciences' GLORIA (Geological Long Range Inclined Asdic) on a multinational series of cruises ranging over a wide area of the Atlantic.

The data acquired will require months of study and analysis but initial findings have already interested British and US scientists and are expected to add considerably to knowledge of the deep sea bed, including key areas for potential oil and mineral resources.

At the survey speed of eight to nine knots the sidescan sonar, the only one of its kind in the world, produces acoustic maps of the ocean floor up to 32 miles wide. GLORIA was deployed for 2,500 hours during *Farnella*'s 33,700 nautical mile voyage, producing images of five million square kilometres of the ocean floor.

The resulting photograph-like true scale sonographs can show areas of unstable sea floor or indicate the presence of strong currents, either of which could cause serious damage to cables, pipelines or rigs. They also help explain the geological processes on and beneath the ocean floor which are crucial to the assessment of resources such as oil, gas and minerals

The first part of *Farnella*'s cruise, which began last September, was a study of the Newfoundland Banks for the UK Department of Energy in order to complete a reconstruction of the North Atlantic as it was about 100m years ago and so assess the petroleum potential of Britain's own continental margin.

This was followed by work for the Department of the Environment to identify areas of the deep ocean where it might be possible to dispose of nuclear

LETTERS

Dumping of nuclear waste

THE recently-announced decision that the government is to abandon plans for disposal of highly-active nuclear waste on shore has rightly been hailed as a victory for the anti-nuclear local movements. However, it now appears from the London Dumping Convention that governments are planning for final disposal by dumping at sea.

At the meeting of this Convention last October, it was argued that highly active waste can, after a suitable period of storage, be re-packaged in such a way as to count as low/medium level waste. From there, of course, it will be a logical next step to ship it out to sea and dump it in the deep ocean.

Lloyd's List for 6 April reports that the research trawler *Farnella* of Hull has already been working for the Department of the Environment to identify areas of the deep ocean where it might be possible to dispose of (high-level) nuclear waste.

The official line will be that the sea is radioactive anyway so a bit more won't matter. Marine environmental experts claim on the other hand that simple total radioactivity is not a good guide since man-made nuclear waste includes alpha-emitters such as plutonium which can be concentrated through the food chain and come to rest in body tissues. From there, even weak radioactivity is operating at very short range and so can damage nearby cells causing cancers and mutations.

I hope that officers who may be tempted to take part in these activities will resist such a threat to future life on earth and that our Association will make it clear now that we will oppose such dumping. The only reasonable solution is to stop generating the stuff.

OWEN W. DUMPLETON
mem no 991017

The Telegraph is the newspaper of the Merchant Navy.

The uncertain Earth and buried wastes

Geologists tend to feel uncomfortable if asked to peer into the future and predict the course of events. We have been brought up on the maxim that the present is the key to the past (rather than the future) since the evidence is generally there to allow second guesses. There is, however, a growing demand for a predictive side to the Earth sciences, in forecasting seismic and volcanic risk and the long-term stability of structures. The ability to do this is being hardest taxed over the issue of long-term behaviour of buried nuclear wastes, where data on geological evolution over tens to hundreds of thousands of years are required for risk analysis.

Predictive geology* brings together 11 conference papers on this topic, plus two on the prediction of natural resource reserves. Performance assessments for a waste repository, in the form of risk analyses, look at both processes and events. The former category includes the slow but inevitable evolution of the geological environment, and is handled by deterministic modelling, whereas the latter (earthquakes, volcanic activity, etc) includes a large probabilistic component. Since risk is generally defined as the product of the probability of an event occurring and its consequences, safety analyses of waste disposal require specific data on probabilities.

Most of the papers in this book dwell on the more comfortable deterministic modelling of groundwater flow and solute transport processes, where probability is not a factor. Here the issue is one of reliability of extrapolated data. It is quite clear from all the papers that in both areas predictive geology is in its infancy, and we are only beginning to approach the issue of confidence in data prediction over long time scales, let alone appreciate the problems of probability assessment. One author quotes the view that geology is "less than immature for this purpose", although I prefer the more optimistic note struck by Ghislain de Marsily in his introduction, rather puckishly dated Halloween 1980. Predictive geology does indeed have a lot to offer, and deserves the attention of some of our best talent. This volume makes stimulating reading.

Lindblom and Gnirk's little book on **Nuclear waste disposal*** owes its success to its delightful and disarming illustrations by Robert Källgren. The complex issues that have to be considered when designing and assessing waste burial systems are difficult to get across to the lay reader, but this simple and readable account, largely based on the Swedish research programme, succeeds admirably. Källgren has enlivened the text with many pages of exceptionally clear drawings to support the author's well-reasoned arguments and descriptions. The overall effect sets this highly recommended book aside fro the many more turgid tex available to the informed no scientist.

Geological confinement radioactive wastes within t European community* is contrast a large, expensiv colourful, and lavishly pr duced volume whose bac ground is the European Cor mission's research projects high-level waste disposal. It essentially an atlas of ro formations within the cor munity nations considered have suitable characteristi for waste disposal, combine with a preamble describin the route to their selectio and the qualitative criteri used. As a readable introdu tory or explanatory text it no match for Lindblom an Gnirk's book, and at over £5 is unlikely to find its way ont many shelves. It will be i teresting to see whether thi early attempt at geograph cally defining host rocks fo disposal of long-lived waste proves diagnostic if and whe such disposal takes place.

Neil Chapma

Dr Neil Chapman is with the Enviro mental Protection Unit of the Institute Geological Sciences, Harwell.

*Predictive geology edited by G. de Marsily and D. Merriam (Pergamon, pp 206, £17·50). Nuclear waste disposal by U. E. Lindblom and P. F. Gnirk (Pergamon, pp 80, £7·50, pbk £3·90). Geological confinement of radioactive wastes within the European community by The Commission of the European Communities (pp 34 + 6 maps, £52·50).

Atom waste expert attacks end to drilling

By Nicholas Timmins

The Government was wrong in its decision last December to abandon the controversial programme of test drillings intended to establish the feasibility of storing nuclear waste underground, Sir Denys Wilkinson, chairman of the Government's Radioactive Waste Management Advisory Committee, said yesterday.

Sir Denys said that the decision could lead to further difficulties with the much more urgent problem of finding disposal sites for intermediate level nuclear wastes.

The drilling programme was undertaken with a view to disposing underground of highly active wastes from the nuclear power programme, after they had been incorporated into glass.

Although the committee has recommended that this ultimate form of disposal might not be needed for another 50 years, allowing time for the waste to cool before being buried in deep underground chambers, the abandonment of the drilling programme — which led to the committee's senior geologist resigning — inevitably delayed the day when a firm decision could be taken about permanent disposal, Sir Denys said. It created a risk that a decision might be taken without full information, although the Government has assured the committee that that will not happen.

Although the Government has insisted that the decision to abandon the programme was not due to the opposition the drilling aroused, Sir Denys said yesterday: "I am sure at least in part it was because of the vigour of public opposition".

That opposition, Sir Denys said, was largely misguided, but the decision might affect the disposal of the much larger quantities of medium-level waste, which would also require some exploratory work on sites before they could be used.

The medium-active wastes are far more bulky than the relatively small amounts of highly active waste, but produce far less heat and so are easier to store.

The number of sites needed would not be large, Sir Denys said, "a few rather than several", but it was important that further public opposition did not delay their development.

New authority to control radioactive waste disposal?

THE DISPOSAL of radioactive waste could get seriously out of hand unless the government acts soon, says the third annual report of the Radioactive Waste Management Advisory Committee published last week.

The committee's warnings come as the government prepares to publish a White Paper on the future of radioactive waste disposal. The paper will be an important document at next year's public inquiry into plans for a nuclear power station at Sizewell, Suffolk.

In the report, the committee attacks the government's decision, announced last December, to abandon its programme of geological surveys to find a site deep underground for the ultimate disposal of long-lasting highly radioactive wastes. The decision caused the resignation of one committee member, Dr Stanley Bowie, earlier this year.

Sir Denys Wilkinson, chairman of the committee and Vice-Chancellor of the University of Sussex, says that the decision, which was taken as public anger grew over each new exploration site, "inevitably puts off the day when a definite decision can be taken about a specific and permanent solution for the management of high-level wastes within the UK, and creates a risk that a decision might be taken at some future date without the benefit of the full range of relevant data".

Meanwhile, the long-term storage of such waste will lead to greater exposure of workers at storage sites like Windscale in Cumbria, says the committee. While highly radioactive waste attracts the publicity, nuclear engineers are more concerned about how to handle the 35 000 cubic metres of "intermediate" grade waste from the nuclear industry in store in Britain.

Much of this waste is dumped at sea in the industry's controversial annual trips to the Atlantic depths. More is dumped in special trenches dug at Drigg in Cumbria, and more still goes into store. The committee says that a new, land-based disposal site for these wastes is needed as a matter of importance and urgency. "The radiological impact of the repository must be considered over a long period of time," says the committee, and "the process of site selection will need to be sensitive to social and political constraints."

The pressurised water reactors (PWRs) earmarked for Britain—starting with the one at Sizewell—will vastly increase the amounts of intermediate waste from the nuclear power industry. "During their operating life, PWRs produce perhaps five times as much of this kind of waste as AGRs (advanced gas-cooled reactors) for the same power output," says the committee.

The committee welcomes discussions between the government and the nuclear industry about the creation of a new executive authority to run waste disposal. It says it expects to be given a chance to comment on the proposals later. □

N. Sc. 17.6.82 p. 761

Watchdog on radioactive waste criticises end of test drilling

BY JAMES McDONALD

THE Radioactive Waste Management Advisory Committee—a Government watchdog—has expressed its "regret" at the Government's decision last December to discontinue geological test drilling to establish the feasibility of underground storage of highly radioactive nuclear waste.

The committee's annual report published yesterday, discloses that Dr Stanley H. U. Bowie—an independent geological consultant and Visiting Professor of Applied Geology, University of Strathclyde (Geology)—resigned from the committee in January "because of the Government's decision.

In its report, the committee—set up in 1978 to give the Secretaries of State for Environment, Scotland and Wales independent advice on waste management policy—says the test drilling programme would have provided the data to enable the committee to advise eventually on the choice between various options available for highly radioactive wastes. The options are stated to be deep disposal underground, disposal on or under the sea bed: or continued storage on the surface.

"While we agree that there are significant advantages to be gained from deferring disposal for some decades, in order to reduce the rate of heat-generation from these wastes, this decision (to stop drilling) must inevitably put off the day when a definite decision can be taken about a specific and permanent solution for the management of high-level wastes within the UK."

Specific information about the detailed properties, conditions and ambience of different rock types in specific areas of the UK, particularly in relation to ground water movement, can be obtained only by a local programme, the report stresses. "Without it, a fully informed decision on geological disposal in this country will be impossible."

The report says, however, that the committee has been given an assurance from the Government that there will be no commitment to the construction of a geological disposal facility for highly radioactive wastes, unless and until a site has been thoroughly assessed and adequate data on the geological environment obtained.

Discussing the report in London yesterday, Sir Denys Wilkinson, chairman of the committee, said he did not believe the Government's decision to discontinue test drilling was on financial grounds.

The report emphasises again the importance and urgency the committee attaches to the development of disposal facilities for intermediate-level radioactive wastes.

This is mainly because of their bulk and the need for additional costly and extensive storage capacity if suitable disposal routes are not made available. It says there is no technical barrier to their disposal.

In that context, Sir Denys revealed that he expected an announcement, "possibly within the next two months" the formation of a national consortium—including such interested organisations as the UK Atomic Energy Authority, British Nuclear Fuels and the Central Electricity Generating Board—as an executive body for the disposal of intermediate-level waste. He regarded that as a "satisfactory and necessary development."

The report notes that there has been controversy recently about the proposed use of borosilicate glass as the medium for storage and disposal of high-level wastes. The committee repeats its previous view that it is the right process for the UK to pursue at present.

Radioactive Waste Management Advisory Committee—third annual report. HMSO.

"SEVENTH MEETING OF THE NEA SEABED WORKING GROUP" =SWG from NRPB Radiological Bulletin No 46, May 1982. NEA= Nuclear Energy Agency of OECD.
The meeting was attended by representatives of the EEC, Canada, France, W Germany, Japan, Holland, Switzerland, UK, USA and observers from Belgium and Italy. They discussed the reduction of research efforts made by several countries into sub-seabed disposal of high level waste, and decided to act in future not only as an information exchange, but also as a group which focuses research and synthesises results. Over the next year the SWG will estimate the costs of the large engineering experiments which are needed to confirm that the technical capability exists to carry out sub-seabed disposal, and which will require multi-national funding. They will also investigate the institutional framework for assessing the feasibility and acceptibility of sub-seabed disposal; its work will include a review of the London Dumping Convention and other agreements. .....it's coming soon...watch this space.....

"BURYING WASTE 'SAFE,CHEAP'. Atom News, Feb 82.
The American Congress Office of Technology Assessment has produced a report about underground, high level waste disposal which claims that "Providing suitable sites can be found, there appear to be no insurmountable technical obstables" to burial "at a cost of no more than a few per cent of the total cost of nuclear power". Since they suggest paying compensation to those affected by disposal work, they presumably believe they'll find a 'suitable' site, but how they describe a few per cent of the total cost of nuclear power as cheap is well beyond me.

DRY STORAGE OF SPENT FUEL", NEA workshop, Madrid, May 1982. from an NEA press release
Experts from 13 OECD member countries and two international organisations were told that "dry storage of spent fuel fuel can now be considered a proven technology. There are apparently 18 years of experience with dry storage methods- using both forced and natural convention currents in vaults, silos and concrete canisters- which show advantages over wet storage, including the elimination of loss-of-coolant accidents and a solution to the problem of secondry generated radioactive waste. Research is to continue into the economic and safety aspects of dry storage but the evidence shows that it doesn't lead to the deterioration of fuel cladding nor produce other damage.

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"COUNCILS DEMAND VOICE IN POLICY ON DUMPING OF NUCLEAR WASTE" Guardian 27July
The Tory controlled Association of County Councils has produced a report in which they claim that the governments nuclear waste policies are 'secretive and encourage public fear'. The report was commissioned after Durham Council were over-ruled by Whitehall, which approved the dumping of 192 tons of low level waste, with a half life of 4 million years, near a river and a housing estate. At present the disposal of low level waste is controlled by the Radioactive Substances Act, 1960, which puts all power in the hands of central government, who only have to notify local councils. The report proposes that councils are consulted over disposals, and that public inquiriesshould be held at the Department of the Environments discretion. They also call for full public participation in the policy decisions which have to be made in the next 20 years(!) about high level waste. Sites on which low and intermediate level waste are dumped should be regularly monitored, and the councils should be represented on the Radioactive Waste Management Advisory Cttee. Police, fire brigades and highway authroities should be consulted about transportation, and rail transport should come under statutory control. The report is "available" from The Association of County Councils, 66a, Eaton Sq., London, SW1.

ıce and pollution endanger Britain's future energy strategy

Nuclear checks 'nearing collapse'

GOVERNMENT attempts to monitor the effects of dumping radioactive waste in the sea are in danger of collapsing, despite continued dumping being crucial to Britain's nuclear industry, a Government investigation says.

Monitoring of this discharge is already widely criticised as inadequate and the report describes it as the minimum required to meet statutory and international obligations.

An investigation by the Ministry of Agriculture, Fisheries and Food says that this country today is responsible for dumping 90 per cent of all man-made radioactivity known to enter the world's oceans. The investigation was sponsored by Sir Derek Rayner, the Prime Minister's adviser in Whitehall, into the ministry's fisheries research operations.

Work on analysing samples for radioactivity is being held up and reports are published nine months behind schedule because of a shortage of staff at the ministry's laboratories in Lowestoft.

It says that five extra posts were authorised after the ministry's failure to publish comprehensive data was criticised by Mr Justice Parker, the inspector at the Windscale inquiry. These have not been filled.

"In view of the crucial

Richard Nelson-Taylor looks at a report condemning failures in crucial areas

role played (by the ministry) in the authorisation of radioactive discharges—in an industry where new waste treatment plant can cost tens of millions of pounds and operational delays a similar if not greater sum—we consider that the situation is untenable in the longer term,' the authors of the report say.

They note that the Royal Commission on environmental pollution had said that Britain's inspection programme was the minimum consistent with public and scientific credibility.

The ministry's research is based on the assumption that release into the water "will occur to some degree whether waste is dumped on the sea bed or below it."

Its research activities will be even more vital over the next five years, the report says.

It cites three reasons:

1. The scheduled expansion of the nuclear power programme at a rate of up to one new power station every two years;

2. Expansion of fuel reprocessing to meet the needs of the UK nuclear industry and waste imported from Japan and other countries;

3. Increased pressure from domestic and foreign sources for more rigorous assessment of new proposals and monitoring of current practice.

The authors reject a suggestion that research should be handed over to the nuclear industry on the grounds that "the activities of Government in this emotive area operate as a check against what the public perceives as an over-powerful nuclear lobby."

Dealing with normal industrial and sewage waste discharged into the sea—the monitoring of which is also criticised—it says that industry and water authorities in future should be charged for monitoring, according to the principle of "the polluter pays."

The lack of enforcement by Britain of international conventions covering industrial and sewage waste has led to serious infringements, it says. These include the dumping of high concentrations of cyanide and heavy metals in supposedly inert materials.

In 1979, the report says, the ministry licensed the dumping of a 11.3 million tonnes of this waste.

"Our pre-eminent position in the dumping of industrial waste and sewage sludge [illegible] us under severe [illegible] ing international [illegible] the onus is on the [illegible] tify its position."

Because of staff [illegible] ministry inspectors [illegible] only 1 per cent of [illegible] loads. The failure to [illegible] legislation adequately [illegible] eventually undermine the UK's position [illegible] opponents of dumping, the document says.

The authors propose that sufficient staff should be recruited to enable the ministry to sample 7 per cent of all industrial loads. This compares with the 1 per cent recently proposed by the House of Lords committee on "disposal of hazardous wastes."

Dumping of industrial and sewage waste is governed by two international conventions as well as the British Dumping at Sea Act, 1974. The International Commission on Radiological Protection has safety guidelines on the dumping of nuclear [illegible].

Only a few extra inspectors would be needed to [illegible] dumping effectively, the document suggests.

The report is likely to be seen as a service [illegible] of the Government's [illegible] directive to all Whitehall departments to cut the number of officials, [illegible] of the importance [illegible] their work.

NEI forms nuclear waste joint venture

By Rod Chapman, Energy Correspondent

Northern Engineering Industries has launched a joint venture company, in response to efforts by the Government to involve the private sector in nuclear waste operations. These will provide waste management services for the British nuclear industry.

NEI Power Engineering of Gateshead will hold a 55 per cent stake in the new firm, NEI Waste Technologies, with Chem Nuclear Systems of Seattle having a 35 per cent share in the equity and Pollution Prevention Consultants of Crawley the remaining 10 per cent. The joint-venture company will provide services and equipment for the treatment and packaging of low-and-medium-level radioactive waste, and for transportation and disposal.

The Environment Secretary, Mr Michael Heseltine is understood to be anxious that the private sector take on more research into nuclear waste disposal and assume some responsibility of the management of waste disposal operations.

The Department of the Environment advertised a number of research contracts last year, and has now received considerable response; NEI has already been awarded two contracts to examine methods of putting waste into solid materials.

The DoE has official responsibility to see that the nuclear waste produced by the Central Electricity Generating Board and British Nuclear Fuels is disposed of safely, and about one quarter of its total research budget is devoted to this subject. The United Kingdom Atomic Energy Authority deals with the treatment of high-level radioactive waste

Nuclear plant loan

By Rod Chapman.

THE EUROPEAN Investment Bank is providing a £50 million loan for new nuclear fuel storage and handling facilities at Sellafield in Cumbria, the British Nuclear Fuels plant formerly known as Windscale. The loan is likely to prove contentious, as environmentalists and other anti-nuclear protesters claim that the plant is already discharging waste which could cause cancer.

The EIB, a Common Market body, said yesterday that the project furthered EEC objectives of improving energy sources and reducing member countries' dependence on oil. British Nuclear Fuels will repay the loan over 12 years at 12.65 per cent interest.

The Tate Committee is currently assessing some £60 million in new facilities for the storage and handling of magnox and advanced gas cooled reactor fuel at Sellafield, which has been reprocessing spent fuel for nearly 30 years. Export contracts for reprocessing spent nuclear fuel from abroad now total about £1.5 billion.

But a report published in April by the Political Ecology Research Group claimed that unnecessary dumping of plutonium waste off the Cumbrian coast was increasing the rate of cancer among local population. It alleged that Sellafield was the most heavily polluting of all the world's nuclear establishments. The study, commissioned by Greenpeace, said the radioactive discharges involved could lead to the deaths of 39 people eventually, while other estimates have put the figure as high as 150.

The US magazine The Waste Paper (published by the Sierra Club Atlantic Chapter, 78, Elmwood Avenue, Buffalo, NY 14201) includes, in its spring issue, an interesting artical about wastes from medical facilities. Apparently, although medical wastes account for 25% of the volume of solid waste, they contain only 1% of the radioactivity, almost all of which (97%) has a half life of less than 60 days. They have produced two charts, each showing the waste streams from a boiling water reactor and from medical sources.

B.W.R.

29% Cobalt-60; half-life 5.26 years
27% Caesium-137; 30 years
14% Caesium-134; 2 years
13% Manganese-54; 290 days
17% other.

MEDICAL

60% Technetium-99^m; 6 hours
19% Iodine-131; 8 days
7% Gallium-67; 78 hours
14% other

Technetium-99^m is metastable Technetium-99. Technetium-99 is toxic for thousands of years.

"GEEN ATOOMAFVAL IN ZEE" is a 400 page Dutch book published this month which will, says WISE, "make you good and angry about the dumping of radioactive wastes in the ocean. It comes in four parts: the waste problem created by nuclear power; actions against dumping, especially the large demos in Holland last Septmber; how dumping can be stopped; and "action tips" from making parrafin bombs to teargas, and what to do if arrested. It costs 14 Guilders + postage from Postbox 5043, 1007 AA Amsterdam.

This comes from the WISE Bulletin, which costs 50p (£@ per year) from 34 Cowley Road, Oxford. Sorry I forgot to credit WISE in the past.

At the end of a hearing into a proposed nuclear waste dump at Moab, SE Utah, USA, the man in charge of selecting the site, from the US DOE, said, "I feel like Daniel in the lions den. I was impressed by their sincerity and the way they were speaking from t their hearts. I guess it got to me. I'll go away and think about it". More than 50 people spoke at the hearing, of whom only one was in favouf of the dump. This is the first inquiry into a "salt site" for Americas first nuclear waste repository. Other salt sites are under consideration in Texas, Mississippii and Louisiana. The best of these will be weighed against a basalt site in Washington and a volcanic 'tuff' site in Nevada. A final decision is not expected for at least a year. Salt Lake Tribune 12.5.82/No Nuclear News.

Two children died in March from third degree burns they received when they came into contact with radioactive waste whilst scavenging outside the Nuclear Fuel Complex in Hyderabad, Southern India. A girl of 5 and her brother died shortly after gathering wood with thei r mother. Three boys and one woman died last year from burns received gathering scrap. WISE news communique, 22.4.82/No Nuclear News.

A couple found buried radium whilst clearing their backyard for a new driveway in Cleveland, US. They found about 200 vials of radium which had been buried in a barbeque pit by the previous owner, the president of a firm which produced luminous clock faces. "When you read a vial that says 'US Radium Corp.- POISON', you know you've got a problem, but you don't know how bad" said Mrs Skiljan, "When a man in a white space suit comes out, you know it's serious." The state will pay the estimated $100,000 to clean-up and decontaminate the area. Times-Herald, 12.5.82/No Nuclear News

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No Nuclear News is a co-operative clippings service covering the wholerange of nuclear activities in America, and, to a lesser extent, elsewhere. Annual sustaining sub is $20 from NNN PO Box 149, Somerville, MA 02143, USA.

In a parliamentary answer the Secretary of State for the Environment said, on 26 April, "About 540,000 Ci of Pu-241 had been discharged from Windscale up to the end of 1981. Its decay has so far led to the formation of about 5000Ci of Americium-241. By the year 2030 it is estimated that about 15,500Ci of americium-241 will have been formed by the decay of Pu-241 discharged to the end of 1981. Plutonium and americium remaining in the sea water will be rapidly dispersed, but some will remain in the areas incorporated in the sediments." Atom, June.

Nuclear waste bill now in sight

But critics fear stop-gap stores will last

Washington

Congress is now closer than ever to passing a nuclear waste management bill, but its terms seem likely to be much more appealing to the atomic industry than to environmental groups, both of which, in a strange alliance, have for years been calling for a legislative solution to the growing mass of spent commercial fuel.

The Senate has already passed a bill that the industry is satisfied will end the uncertainty plaguing the government's waste disposal programme. In the absence of legislative directions, each administration has been free to set its own policy, usually inconsistent with that of the previous administration.

The environmental lobby, on the other hand, is worried that the Senate bill and its counterparts now under consideration in the House gloss over the serious technical problems of waste management in favour of political expediency.

At present, 8,000 tonnes of spent commercial fuel is in temporary storage at reactor sites. By the end of the century, the figure is expected to reach 72,000 tonnes. The ultimate solution, everyone seems to agree, is to dispose of it in deep geological repositories. This solution is provided for in all versions of the bill.

The bone of contention, however, has become whether the federal government should in addition provide some form of interim storage. According to the Atomic Industrial Forum, which represents the nuclear power industry, roughly half a dozen reactors will run out of on-site storage space by 1985; the problem will be widespread by the 1990s. The industry is thus very pleased that the Senate bill provides for stop-gap storage to cover any delays in a permanent repository.

The environmental groups see something more sinister going on. The interim storage envisaged in the Senate bill will be of two kinds. The first is "away-from-reactor" (AFR) storage, which is essentially the arrangement used at reactor sites: spent fuel elements are simply stacked in a water-filled "swimming pool" which absorbs the radiation and heat. The environmental groups charge that AFR is a way for the industry to avoid the licensing procedure required to expand on-site storage. The second kind of facility is "monitored retrievable storage" (MRS), which is only vaguely defined. The chief worry among the environmental groups is that MRS will become the *de facto* permanent solution.

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Brooks Yeager of the Sierra Club says that the Senate bill virtually guarantees that. It sets "not just ambitious, but unmeetable deadlines" for the construction of a geological repository. "They want to arrive at the issuance of a construction permit by the end of the decade. That's seven years faster than the Department of Energy's plans for construction in order to resolve all the technical problems." The timetable may also guarantee that the choice of sites will be limited to the three at which the Department of Energy has already begun tests — the Hanford Reservation in Washington state, the Nevada test site and a group of sites along the Gulf of Mexico.

Professor Henry Kendall of the Massachusetts Institute of Technology, who is active in the Union of Concerned Scientists, a group critical of US nuclear policy, agrees that building an MRS facility "basically means you don't have confidence in permanent disposal". He says that what is needed is time to make a careful hydrological study of the actual site.

These worries seem to be backed up by a recent study by the Congress's Office of Technology Assessment (OTA). The report* urges that waste be kept at reactor sites until a permanent repository is built to "avoid diverting the attention and efforts of the waste management agency away from the repository program toward provision of an independent interim storage facility".

Another sore point for environmental groups in the Senate bill is an amendment that Senator James McClure succeeded in attaching, which declares that the legislation itself represents reasonable assurance that a safe disposal method exists. Yeager says "It's a clear attempt to end-run several court cases and state laws". California, Oregon and several other states have passed laws restricting new power plants until such reasonable assurance exists.

To the industry, however, the amendment is nothing more than recognition of what they see as the obvious: the waste disposal problem is political, not technical. And here, the Office of Technology Assessment report backs the industry view. It found "no insurmountable technical obstacles" to development of geological repositories; rather, the chief obstacle is eroded public confidence, aggravated by a vacillating federal policy. President Carter, for example, reversed the previous policy of handling defence and commercial wastes separately; President Reagan reversed the Carter policy. Presidents Reagan, Carter and Ford each changed the number of sites under study for geological repositories and their construction schedules.

If a bill does emerge from Congress this year, it will almost certainly contain provisions to end this instability. Both Senate and House versions provide for long-term funding through a surcharge on nuclear electricity, which could raise $300 million in the first year.

Both Senate and House versions also set up mechanisms for state participation in the site-selection process. The federal government's insensitivity to the concern of the states in previous siting decisions is viewed as a major factor in the loss of public confidence in the programme.

The chances that Congress will act this year are, according to all parties involved, better than they have been in past years. In 1980, both the Senate and the House passed bills, but failed to work out a compromise. This time, they start closer.

According to a staff member of Morris Udall on the House Interior Committee (Udall introduced the House bill), "there's no reason we can't get a bill except time". The prediction is that if the bill reaches the full House by mid-July, it should pass.

But passage may ultimately hinge on the complex politics of the House committees. No fewer than three have asserted jurisdiction over the measure, which is now tied up in the Energy and Commerce Committee.

Stephen Budiansky

**Managing Commercial High-Level Radioactive Waste* (Office of Technology Assessment, May 1982).

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If anyone is particularly interested in the American
situation, I also have the following articles, any of
which I can supply copies of.
"The Senates plan for nuclear waste", Science, 14 May.
"Nuclear Waste Disposal" Environmental Science and
Technology, Vol 16 No 5, 1982. American Chemical
Society journal.
"Senate Approves Bill" L A Times, 30.4/Ho Nuclear News.
Also a series of interesting blow-by-blow accounts
of the US political process, in monthly installments
in a US publication called Critical Mass Energy Journal,
about which, I'm afraid, I know nothing.

"[illegible] STORING UP TROUBLE FOR THE SANDS OF YEARS" is a long, rambling artical in Guardian Futures, June 24th, by Denys Wilkinson, in which he sets out his current position. He neatly avoids the Flowers demand that "there should be no commitment to a large programme of nuclear fission power" until the waste can be safely contained by saying that the proposed PWR programme is not sufficiently large to matter. He says that it is "absurd" to contemplate perma nent storage, and so comes back to his belief in reopening the discredited test-bore programme.

"NUCLEAR WASTES CONSERVATION" is a rather silly artical (at least, I hope it's silly) in New Scientist, July 22, which suggests that the best way to stop people defoliating the tropical rain forests is to use them to bury vitrified waste in, as then no-one in their right mind would go anywhere near it. Ho-hum.

"Back in the BOMB BUSINESS" by Duncan Campbell in New Statesman, 2 July, about plans to build an entirely new weapons manufacturing facility at Aldermaston. Linked with this will be a new waste treatment complex, designed to replace the existing, aged waste treatment facilities which have been out of use since 1978 when workers refused to entre them because of Pu contamination. The new buildings will include a decontamination centre, which will deal with the disposal of dangerously contaminated equipment, including 400 gloveboxes, some weighing 8 tons, the legacy of 25 years of bomb making. The design of this has not yet been completed. "No-one is certain how the work will be done, But it will take at least 5 yeasr, and cost over £25million. Some £21 million has already been spent clearing up other contaminated buildings at Aldermaston." There will also be a liquid wa te building to treat nearly a million gallons a year of Pu contaminated liquid. The residue will be pumped into the Thames near Pangbourne. This replaces a 30-year old building which does not comply with present safety standards. A new solid waste facility will be built, to prepare an estimated 700 packages of solidified Pu containing radioactive sludge, and over 2000 drums of solid waste every year. "The weapons manufacturing activity at Aldermaston already produces more drums of radioactive waste than Britain is allowed, by international quota sy stem, to dump at sea. In consequence a static stockpile of drums is building up at Aldermaston. Two new 'radioactive dustbin' warehouses are to be built to hold the waste material, starting next year." None of this major rebuilding has been subject to public or parliamentary scrutiny. The decision to press ahead was made at least a month before the Cabinet took the Trident decision in June 1980.

"THE EUROPEAN NUCLEAR DISARMAMENT CONVENTION denounces before international public opinion the nuclear waste dumping that is to take plave once again offthe Galician coasts in the Atlantic Ocean.

The enormous dangers of this waste makes it necessary for Europeans and all citizens of the world to mobilise in support of the movements and organisations in Galicia and other countries which are struggling to prevent the Atlantic becoming an nuclear dustbin.

Initiatives such as that of the boat 'O Xurelo' hired last year to obstruct dumping serve as a n example for future activities.

At the same time this Convention calls on responsible governments to stop nuclear waste dumping and, upon Galician and Spanish governments to intervene actively in its prevention.

The Atlantic Ocean should be a source of life. All nuclear waste dumping off the Galician coast should cease immediately.

Finally the Convention expresses its support to the inhabitants and movements of the Pacific Ocean who are confronting similar problems."

This resolution was agreed by the workshop on Civil and military nukes at the END convention in the beginning of July. It was not read to, or agreed by, the whole convention. I have the name and address of the contact group in Galicia (who proposed the motion) should anyone wish to contact them.

A letter to the Times of 11th June by Councillor Simon Turney points out that, contrary to the Times' impression, the GLC is trying to stop nuclear waste transport through London as part of the Nuclear Free Zone concept.

Rising doubts over atomic dumping

By Pearce Wright,
Science Editor

Concern is growing about the rise in the volume of nuclear waste discharged at sea, 80 per cent of which comes from Britain. Yet the material dropped on to the sea bed is only a fraction of 1 per cent of the nuclear waste that is accumulating. Furthermore, it is classed officially as low-level waste, to distinguish it from the more hazardous stocks of intermediate level and high level wastes for which methods of disposal have yet to be found.

One reason behind the present protest by the Greenpeace organization is its claim that the British and other governments are seeking changes to the international treaty, under which ocean dumping occurs, to allow disposal at sea of intermediate and high level wastes.

The United Kingdom Atomic Energy Authority's (UKAEA) laboratory at Harwell, near Didcot, organizes the disposal at sea from a converted freighter the Gem. The rubbish from generating stations, nuclear fuel fabrication plants, research laboratories and industry, is compressed into drums and sent by rail from Didcot to docks at Sharpness, Gloucestershire.

The volume of low level waste discharged at sea by the UKAEA has certainly soared since the first test dropped in 1949 with one hundredweight container holding one curie of radioactive material. It is the level of radioactivity rather than the volume of material which is the key factor; and the level rose from 3.5 curies in 1950 to 279 curies in 1960. With the rapid development of the weapons and nuclear power programmes, dumping increased to 20,450 curies in 1970, over 100,000 curies in 1980 and 107,250 curies this year.

But the level of radioactivity is only one factor in the calculation of cancer risk. Some nuclear materials are 1,000 times more dangerous than others.

To calculate the risk the International Commission for Radiological Protection has devised a scale of radiotoxicity. It shows, for example, that inhaling strontium 90 is about seven times more dangerous than inhaling the same level of iodine 123; and plutonium 239 is 20,000 times more hazardous again.

These variations are due to the way the body retains some substances and rejects others and to the physiological effect of the particular types of radiation.

The overriding factor governing the storage or disposal of waste is that radiation has only one biological property; it destroys. Moreover, there is no known safe level. But the recommended safety limits issued by the International Commission for Radiological Protection for industrial workers come from laboratory research with animals, the results of continuing studies of the victims of the Hiroshima and Nagasaki bombs, and information from the use of radiation for medical purposes.

But there are complicated technical difficulties of handling or disposing of nuclear materials for several reasons. First, wastes arise as gases, liquids and solids. Second, the danger to health and the necessary protection methods differ depending on whether the radioactivity lasts for a few days or lasts thousands of years. Third, the nature of the damage is determined by whether the substance is a bone-seeker, and hence gets embedded in bone marrow, or focuses on another target organ like the gonads, ovaries, lung, liver, kidneys or brain.

The main source of wastes are nuclear fuel manufacturing for power station and weapons, waste reprocessing and decommissioning of nuclear plant.

No commercial power station has yet been dismantled; it will be 10 years before the first stations built in Britain are scheduled for decommissioning. Then, the reactors will be encased in concrete for 100 years to allow the radioactive contamination to decay until dismantling can be considered. On the military side, proposals made last year in the United States for scuttling old nuclear submarines in deep ocean have been shelved.

The residue from one year's operation of a nuclear power station, including that produced in fuel-manufacturing and spent fuel reprocessing operations, is about 2,000 cubic metres of low level waste, 100 cubic metres of intermediate level waste and two cubic metres of high level waste.

Low level wastes are mainly materials with short radiation lives. They are stored for a few weeks until they have cooled and their activity has fallen sufficiently for them to be packed into disposal drums.

The high level wastes, which consist mainly of the most powerful radiotoxic substances, the actinide series, must be strictly controlled for long periods. Only one actinide, plutonium, is extracted for future reactors or for military use. Actinide wastes are kept underground, biologically isolated, double-walled, stainless steel tanks under constant stirring cooling and monitoring.

However, successive government reports, including one from the Royal Commission on Environmental Pollution in 1976; *The Control of Radioactive Wastes* in 1979; and *Radioactive Waste Management* last month assert that there is no scientific obstacles to highly active waste disposal.

Next: International treaties

The people of the tiny Pacific state of Belau, in Micronesia, have a saying: "Do not throw the poisonous seed of the Yalu fruit into your neighbour's yard lest it kill their chickens."

The proverb neatly summarizes the growing controversy over sea disposal of low-level radioactive waste.

Belau is one of nine states fighting a Japanese proposal to dump up to 10,000 curies of low-level waste a year, roughly the same as this week's British consignment, 400 miles from their territorial waters in the Pacific Ocean basin.

Their argument is refreshingly simple but carries fundamental implications. Countries such as Japan and Britain should "keep their radioactive waste in their own yards".

The battle for the oceans centres on the so-called London Convention of 1972, on marine pollution from waste dumping, agreed by some 50 states, including Britain. The convention, meetings of which have traditionally been sedate, private and uncontroversial, threatens to turn into the sort of contested arena more characteristic of whaling politics.

That is largely because of the activities of Greenpeace, which last year gained observer status and is now lobbying hard to build up an anti-dumping vote in delegations.

Recent successes include the recruitment of two Pacific states, Kiribati (formerly the Gilbert Islands) and Naurau, which have agreed to propose a ban. Support is also likely from Scandinavia. Like the International Whaling Commission, weighted majorities, in this case two-thirds, are required, which seems unlikely by the next meeting in February.

The environmentalists' case is that dumping nations like Britain are flouting the convention. They point to worrying evidence from new environmental surveys of post-war American dumpsites, now abandoned. They also cite evidence that countries are planning to dump more and higher-level waste at sea.

The convention calls for monitoring of the dump site. The Ministry of Agriculture, Fisheries and Food, which grants licences for British ships using the site 500 miles off Land's End, agrees that there is no monitoring. It says "samples" are taken but does not publish them. And instead of the "detailed environmental and ecological assessment" called for by the International Atomic Energy Authority (IAEA), reliance is placed on mathematical models of ocean behaviour.

The ministry says the models are fed the most pessimistic assumptions but still show human dose rates of less than a thousandth that recommended by the International Commission on Radiological Protection. But according to experts like Mr Jackson Davis, Professor of Biology at the University of California at Santa Cruz and adviser to the Pacific states, the models are fundamentally, and dangerously, flawed. As an example, he cites their failure to take account of recent oceanographic findings of fast currents and huge upwellings at very low depths. They also ignore studies showing American waste dumped up to 30 years ago leaking, concentrating in local sediments and apparently working into the food chain.

Some samples of fish caught had plutonium concentrations of up to 5,071 normal levels, the studies show. But ministry scientists argue that comparisons with the American site are misleading.

What chiefly worries environmentalists, however, is the move within the IAEA away from quantitative dump limits as the criteria for disposal, and towards an assessment of what levels of radioactivity the oceans, the food chain, and ultimately man, can safely absorb.

The approach puts a high premium on accurate prediction and could result, opponents believe, in the world's seas growing slowly more radioactive.

States like Belau meanwhile face the inequitable prospect of suffering the potential hazards of dumped waste without benefiting from many of the processes that produce it. The resulting tension seems certain to make the London convention far better known than many of its signatories might wish.

Next: The dangers

Pt 3 over

Nuclear waste controversy: 3

Weighing the risks of a disaster

Times Aug 13

By Pearce Wright, Science Editor

Many scientists, nuclear engineers and informed laymen perceive the risks of nuclear power to be relatively small and, indeed, necessary in order to exploit an essential source of energy. But the production of nuclear-generated electricity today creates radioactive by-products, some of which remain active for thousands of years.

Even with rigorous engineering and strict safety regulations, experience has shown that nuclear accidents can occur.

These residues can cause contamination in two ways. One involves the sudden rupture of a nuclear reactor, or an accident when material is being transported, releasing a dense cloud of radioactive fallout or liquid discharge. Such a spectre was raised by the Three Mile Island accident.

The other is a more complicated process because it involves the slow but persistent spread of substances by leakage of waste.

The first event would be a disaster of appalling proportions. To help government advisers to prepare nuclear safety regulations, a method for assessing the health consequences and the economic costs of food and land restriction has been devised. Earlier this year The National Radiological Protection Board completed the formula for calculating the effects of an accidental release.

There is already a furious debate over the likelihood of that sort of accident happening. It will be argued at length at the public inquiry in January into plans to build the first of the controversial American-type pressurized water reactors (PWR) in Britain.

At the end of a year's operation a PWR has created in a reactor about 2,600 million curies of fission products. Many are short-lived. That is why when fuel rods are changed the spent fuel is kept for a year in cooling ponds at the power station before being transported by road and rail to Sellafield, as Windscale is now called, for reprocessing.

One of the early and most serious consequences of a radioactive emergency is the release of volatile iodine 131 and 133. There are about 200 million curies of iodine in the PWR. It is of concern to public health because if absorbed by the body, iodine tends to concentrate in a single organ, the thyroid.

More controversial are the potential dangers from gradual seepage of radiation from direct discharges from nuclear plant, or leaks from waste deposits on land or at sea.

The possibility that cancers might result from small doses of radiation was not considered seriously until 25 years ago. Now there is general agreement among a majority of radiobiologists that even very small doses of radiation may give rise to a tiny but finite increase in the incidence of cancer.

On the other hand they disagree about the magnitude of that increase, and about the way it varies with different types of radiation and different doses.

Natural background radiation is believed to account for 1 to 3 per cent of all cancers in the general population. But the man-made radiation from nuclear waste is largely in the form of alpha and beta particles, which causes damage after it has got into the body. Moreover, the evidence shows that such cancers take a long time, 20 to 30 years, to occur.

By definition, storage is a provisional method of dealing with nuclear waste. But it has provided time to study various options for ultimate disposal of intermediate-level wastes, such as large contaminated engineering items from nuclear fuel plants and reactors, and the long-lasting highly active liquids held in continuously cooled tanks at Sellafield.

Responsibility for the first group will be taken over by the new Nuclear Industry Radioactive Waste Executive based at Harwell, announced by the Government three weeks ago. The executive's job is to collect all the medium waste for disposal in two, or perhaps three, new centres within the next 10 years.

The first disposal technique will be an "engineered trench" for containing waste untainted by plutonium, buried at a depth of 20 to 30 metres. The second will be a modified mine or specially excavated vault about 100m deep.

The liquid wastes will be converted into glass blocks at Sellafield and held for 50 years before burial, either underground or beneath the sea bed.

Concluded

£3,500M COST OF A-POWER SHUTDOWN

Tel 13-8-82

By Our Commercial Correspondent

EVENTUAL closure and clearance of nuclear power stations may cost £3,500 million, according to the Central Electricity Generating Board in a leaflet designed to soothe public fears on how the job will be done.

"While it is expected to be some years before there is a need to start decommissioning any CEGB nuclear station, the board is nevertheless studying in detail the procedures likely to be involved," it states.

An engineering plan for dismantling the earliest stations is being drawn up. The first step would be to remove fuel and seal off reactors to ensure there could be no escape of radiation. The second stage, possibly over 15 years, would be removal of buildings other than that housing a reactor.

The board would like to leave reactors sealed off under its supervision for 100 years, but recognises it may in some circumstances have to act earlier. Depending on timing, the total removal cost would vary from £150 million to £270 million per station at current price levels.

The board has nine nuclear power stations in use and four being built. The oldest are at Berkeley, Glos., and Bradwell, Essex, which came into use in 1962.

A new edition of the Waste Paper reveals that US nuclear submarines routinely drain the primary coolant from the reactor into the sea, once every six months. This is estimated to be some 400 Ci of isotopes including a large percentage of Cobalt-60 and Caesium-137. As there are 121 nuclear powered US subs, the entire fleet discharges around 10,000 Ci per year, if this information is factual. Recently the USS Simon made a 2-day trip out to sea to dump "low-level" waste. "But, I though the Americans didn't dump at sea..." Hmmmm. It seems reasonable to suppose that, since British nuclear subs are built to American design, they similarly discharge their primary coolant at sea. If anyone has any information about this please let us all know.

The Sierra Club radioactive waste campaign (who produce the Waste Paper) have produced T-shirts ("You can't run from radioactive waste" @ $6.95+p&p or "The end is only the beginning...STOP OCEAN DUMPING" @ $6.00 +p&p) from 78 Elmwood Avenue, Buffulo, NY14201.

Nuclear Energy, journal of the British nuclear energy society, has produced a special issue about waste management (Vol21, number 3, June '82). The main paper, by Duncan and Brown of the DoE explains the development of an inventory of arisings to the year 2000, together with options for their management, with associated timescales. I shall attempt to reproduce the tables of waste arisings produced (if they don't come out I'm afraid you'll have to contact me for photocopies), which makes very interesting reading, despite the lack of information about defence arisings. Interestingly, an assumption is that a 300m deep, land based facility will be commissioned in 1991 for highly radioactive, non-heat-generating waste. A similar facility for heat-generating waste will be developed 'after 2010' as will a deep sea bed facility for HLW. Before this there will be a 20-30m deep facility for unrestricted beta/gamma waste and 3Ci/m^3 alpha (at Drigg the limits are 60mCi beta/gamma and 3mCi alpha, by comparison) by the late 1980's, and a 100m deep mine for 50Ci/m^3 alpha by 1990. Deep burial is still very much on the cards. Since the DoE are the people in charge of developing policy, it seems reasonable to suppose that this article, taken together with the recent White Paper, indicate the direction waste policy is to take. If we want to critisise, or make any positive contribution to the future policy, now is the time to do it. Well worth reading in full, at good libraries, or photocopies available.

Four members of the Institute of Geological Sciences have contributed a detailed paper about the research programme into the deep disposal of high level wastes. They start from the premis that "the geologist is not considered to havesufficient knowledge to statewhich geological environments might be most suitable...the effectiveness of the geological barrier...still has to be demonstrated." Their conclusions, however, (which take into account the results from Altnabreac and desk studies)are:

1. From a geochemical viewpoint there is no necessity to store conditioned wastes for more than a few decades before disposal.
2. The work suggests there to be no value in designing for containment of wastes in canisters or engineered barriers once a repository has been sealed.
3. The basis of reliability for any assessment is the degree of confidence placed on predictions extended to very long periods in the future. Realistic groundwater flow and transport models have yet to be validated in the field in any country...
4. The study of waste form and engineered barrier behaviour must be linked closely with groundwater flow data derived from field studies...
5. Hydrogeological studies need to be related to the influence of specific features (topography, faults, intrusions, discontinuities, joints, etc)in order to make eventual site selection a logical process. This work formed an integral part of the recently abandoned drilling study....

Perhaps not surprisingly they end with a plea for the drilling programme to be reopened, so that various options (land, on- or under- the sea bed) may be assessed.

Dr J B Lewis of Harwell has contributed an optimistic paper about the migration of radionuclides from buried wastes. Using data from Drigg low level, shallow burial site, extrapolated through mathematical models ("Since the half lives of many species are very long it is not possible to set up migration experiments which reporduce exactly the future sequence of events. It is necessary therefore, to develop mathematical models.."), he concludes that most nuclides are effectively immobilised (by adsorbtion to soil, etc)while "the migration of mobile nuclides will probably be delayed sufficiently by matrix diffusion or related phenomena so that they pose no problem either."

(Review of Nuclear Energy continues)

NUCLEAR ENERGY, June 1982, Continued.

Three members of the CEGB, Northwestern Region have contributed a paper about the developments in the conditioning of power station (Magnox) wastes concentrating on "the use of thermosetting polymers in ordinary Portland cement". The purpose of the treatment is to prepare wastes for sea dumping. I'm afraid most of the article means little to me (eg, I have no idea what a 'water extendable vinyl ester' is) but the general conclusion seems to be that they think they know what they're doing, though further development is underway in the interests of increased economy, flexibility and simplification. They are confident that "there will be little difficulty" in applying existing techniques to AGR waste streams. A study of waste streams and treatments for a British PWR is underway, but again they are confident that "no major problems will be encountered", a conclusion backed up by experience overseas.

The journal also contains two other papers of slight relevance, though they are rather technical. One, from the AEA at Springfields, considers developments in microwave vitrification of (simulated, so far) waste streams from FBRs. The other, from Harwell, looks at the results of an inactive test rig to immobilise Krypton-85 in a metallic matrix. An active test rig is being designed.

Finally, there is an (unsigned) article about the Urals disaster in the USSR in 1958. Apparently the Los Alomos National Laboratory has produced a report (LA-9219-MS) which identifies contamination, both radioactive and chemical, in the area from 1953 "arising from a general disregard for environmental pollution as a result of military pressure to maintain plutonium production." Claiming that "as with all previous analyses, no direct evidence is produced" it then goes on to say "the substantial amount of supporting evidence for the Alomos analysis makes it perhaps the most convincing explanation so far." Thus there was "no accident-just blatant disregard for people and their surroundings." I've heard stories like that before... I wonder where from?

The Journal of the European Nuclear Society, Vol II, No6, June 1982 contains a 'Public Policy statement' about the sea disposal of nuclear waste. This satarts by saying "Several countries organise an annual opeeation for the dispoal of solid radioactive wastes at a suitable site in the Atlantic. The protection of the marine environment is ensured through adherence to all provisions, guidelines and controls....." (Perhaps it's worth mentioning that Britain- which contibutes over 90% of all radioactivity dumped- has not properly assessed the effects of dumping on marine organisms, does not monitor the site, and has not carried out assessments of land based alternatives, all in breach of the various international provisions, guidelines and controls. Ah well...) The statement continues in this sort of vein, which would be funny, were it not for the persistent rumours that other European countries (esp Germany) want to start dumping at sea, and it's bound to be used by Britain, the US, Japan to justify continuing, resuming or starting dumping. ENS does, after all, "group, through its affiliated member-societies, more than 13000 scientists and engineers active in the field of nuclear energy."

The issue also contains an article about the Dutch waste management, which reveals that exploratory drilling for HLW mines in salt formations has been stopped by the Parliament following public opposition around the sites. Work on general properties of salt continues, however. Because the Dutch reprocessing contract with Windscale specifies that conditioned waste material will be returned, a high priority is being given to the realisation of an interim facility. When further study of land salt formations was halted attention turned to salt under the North Sea, with a view to the creation of an international facility based on an artificial island (artists impression shown, but not reproducable). They are also participating in OECD/NEA studies into the existing NE Atlantic dump site and the identification of other deep sea sites.

There is also a general overview of the European waste situation, showing that the most advanced HLW schemes are in salt domes at Gorleben, in Germany (disposal not before the early 1990s), in clay in Belgium, where a shaft is being sunk for an underground laboratory, and in granite in Sweden (not less than 40 years). Britain is not included in a list of countries whose plans have reached only a 'generic conceptual design stage'. Medium level waste is injected into deep isolated porous strata in Russia; dumped at sea (which "may be expected to continue until adequate other disposal facilities on land become available"!!); disposed of in old salt mines in both E & W Germany, in an old limestone quarry in Czechoslovakia, and in an abandoned mine in Spain. W Germany is seriously evaluating of opening an old iron ore mine "at short notice".