

The Ecologist Digest

Chemicals, Drugs, Health and Pollution

Faulty tests mean pesticides face ban, Nancy Heneson, *New Scientist*, August 4th 1983.

Manufacturers of 13 pesticides have three months to convince the American Environmental Protection Agency (EPA) of the safety of the chemicals or else face a ban. The pesticides were all tested by the now defunct Industrial Bio-Test Laboratories (IBT). The EPA has declared that three-quarters of tests for toxicity carried out by IBT are invalid. Companies involved include Ciba-Geigy, Shell, Monsanto and Gulf.

In 1976, a routine government inspection revealed serious discrepancies between the laboratory's raw data and the final results submitted to pesticide manufacturers. The following year, EPA stopped registering new products that IBT had tested. In 1978, the Justice Department in the US began an investigation of IBT, and EPA started reviewing all the studies made by IBT of pesticides already on the market.

The agency reviewed 801 chronic-health studies done by IBT on 140 pesticides and found 594 of the studies were invalid. However, according to an EPA report of July 11th, only two pesticides in heavy use in the US have no data other than the invalid IBT tests to support their safety.

Environmentalists want all pesticides improperly tested by IBT removed from the market. But EPA says the law prevents it from doing so until other studies show 'valid evidence of risk'. Of the 594 invalid studies, 212 have been replaced or are in the process of being replaced by tests which are designed to placate the EPA.

However, a member of EPA's registration division said the agency's review of the replacement studies could take another year and that "a lot of times replacement studies have turned up invalid".

Governments fail to report on toxic waste, Andrew Lloyd, *New Scientist*, August 4th, 1983.

The European Commission is threatening to take seven European nations to court if they do not complete a report on the practices of toxic waste dis-

posal. The countries promised to complete the reports by the end of 1981. But so far only three nations, Britain, Germany and Luxembourg have submitted the required document.

"The failure to compile the reports is symptomatic of governments' attitude to waste disposal regulations," says Joyce Quin, a member of the European parliament. Quin's questions prompted the commission to reveal it was taking action to push defaulting nations into writing their reports.

Member nations have also been lax in compiling national reports on waste in general, oil waste and PCBs (transformer fluids), says Nigel Hay of the Institute of European Environment Policy in London.

Quin says the Commission is under pressure to get things done. "They get a lot of questions from European MPs because there's such a lot of local concern," she says. "The annoying thing is that governments will go along with regulations proposed by the Commission. But when it comes to carrying out concrete measures they do nothing."

Whether the completion of the reports will have much effect is not clear. Of the three submitted, "some are inadequate" says a Brussels official. Refusing to identify these, he says poorly-compiled reports are as bad as no reports at all. But if the reports had been done on time, the debacle over the missing dioxin from Seveso might have turned out differently.

US study says acid rain can be beaten, *New Scientist*, July 7th 1983

American scientists have delivered their most powerful evidence yet that reducing pollutants from coal-fired power stations will blunt the effects of acid rain.

A panel of experts assembled by the National Academy of Sciences (NAS) concludes that the relationship between emissions of sulphur dioxide (SO₂) and oxides of nitrogen (NO_x) from smokestacks, and the amount of acid deposited across the United States is linear: that means a 50 per cent reduction nationwide should cut acid rain by the same amount.

The panel's finding differs from that of European scientists who say that a cut in pollution might bring little improvement to lakes or forests. Defenders of coal-fired power have seized on this to argue that expensive controls on power stations in the US might only cause a meagre drop in acid deposition in the north-east and Canada, where pollution from America's industrial heartland arrives aboard prevailing winds.

President Reagan's own experts argue that there

is no proof that spending billions of dollars to reduce emissions from smoke-stacks will have much effect. The coal industry and power plants agree. Days before the NAS released its findings, the electric industry's research institute predicted that cutting emissions by 50 per cent would raise prices by anything up to 50 per cent.

The coal industry hit back at the panels' results by focusing on the uncertainty in the figures. Nevertheless, a number of revelations in the past month on acid rain all point an accusatory finger at fossil fuels. A team of government scientists has said that man-made pollution is probably the main cause of acid rain in the north-east. And two days before the NAS went public with its findings, the White House's own science advisors, said it is time to act. They recommended little, however, except cutting emissions from smelters and washing coal more thoroughly before burning it.

Dioxin still lurks in Seveso's gardens, *New Scientist*, July 14th 1983.

Italian scientists are this week combing the town of Seveso looking for traces of dioxin. This follows the discovery of the chemical in a garden that was said to have been decontaminated after the explosion at the town's chemical works in 1976. The discovery raises the fear that, seven years to the week after the accident made the town a by-word for disaster, the dioxin may still be present in the homes of some 5000 people in the original zones of contamination.

Alberto Piepoli, an engineer at Seveso's 'special office' on decontamination, said that tests for dioxin had just been resumed in the area as part of a 'remapping' of contamination. He did not explain why tests were being restarted after a five-year interval. But locals believe it has something to do with the case of Gisele Colombo, a five-year-old girl who has lived all her life in the 'decontaminated' zone of Seveso. She has a chronic liver disease which doctors at the University of Milan say may have been caused by dioxin.

The land around Gisele's home was scraped to a depth of 20 cm after the accident and new soil dumped on top. But chemical tests on the new soil taken after doctors expressed their fears about Gisele, uncovered up to 15 micrograms of dioxin per square metre.

Triana: a town poisoned by DDT, Kathleen Johnston, *New Scientist*, May 26th 1983.

The twelve hundred poor, mostly black citizens of Triana, a small town in northern Alabama, have won an unprecedented \$19 million settlement from a chemical company that contaminated them and their town with DDT.

The Olin Corporation, one of the world's largest manufacturers of chemicals, made DDT for many years at a plant on the army's Redstone arsenal near Triana, until the factory closed in 1971. Now it has agreed to compensate the townspeople, clean up the DDT in the soil and waters within 10 years, and spend \$5 million to monitor the health of local citizens.

The DDT ran from a waste ditch near the plant into the Indian Creek as it flowed past the arsenal and through the town, contaminating water, sediments, wildfowl, fish and, finally, the people that ate the fish. DDT levels in five species of fish in the creek averaged 204 parts per million and peaked at 450 ppm, according to a government survey carried out in the late 1970s. Wildfowl in a nearby swamp were found with up to 2252 ppm of DDT in their flesh. The Tennessee Valley Authority claimed that at least 4000 tonnes of DDT had found its way into sediments in a local branch of the Tennessee river.

For several years, the population of Triana had eaten fish and drunk water contaminated by DDT from the Olin plant. In 1979, eight years after the plant closed, epidemiologists from the Centres for Disease Control in Atlanta, Georgia, first took blood samples from residents of the town. In one case, the results showed a level of DDT twice as high as any previously reported in the medical literature. Other samples were comparable to those previously seen only in the most heavily-exposed workers at pesticide plants. Thirty-three people were found with DDT levels in their blood above 500 parts per billion. Six had levels above 1000 ppb.

Who pays the bill for pollution?, *New Scientist*, July 14th 1983.

Ministers are considering a proposal to subsidise industries that agree to cut pollution. But they may also decide to charge companies that dump filthy water into rivers. The ideas would bring Britain more into line with European methods and they are backed in a report from the House of Lords' Select Committee on European Communities and have some support in Whitehall.

The Lords' report, *The Polluter Pays Principle*, finds that, in Britain, the polluter rarely pays for the cost of its pollution. Too many industries still believe that they are entitled to "free use of the environment as a sink" for pollutants. The report lists examples, such as the notorious smokeless fuel plant at Aberaman in South Wales which has been condemned by clean air inspectors but remains open (*New Scientist*, vol.90, p.745). Other offenders include power stations that contribute to acid rain and marine oil polluters.

The Lords disagree with the claim by the Department of the Environment that Britain already adheres rigorously to the so-called polluter pays principle.

The Lords recommend that Britain should take advantage of a rule of the European Community which allows government subsidies of up to 15 per cent on investment in cutting pollution.

Evidence from Environmental Data Services, the consultants, says that pollution from Britain's declining industries could get worse as hard-pressed industries fight for survival in the marketplace. A submission from ENDS, which the Lords say appears 'soundly based', concludes that "the UK's declining (and generally more polluting) industries will find it a struggle to meet pollution control standards even under the best foreseeable economic circumstances of the next decade or so. We believe that breaches of the polluter pays

principle could become more general and that unacceptable choices between employment and environmental quality will be presented to local communities, unless serious consideration is given in the UK to some form of state aid".

Love Canal is in Limbo Again, Marjorie Sun, *Science*, July 8th, 1983.

It is unclear whether the Love Canal is suitable for habitation, according to a new report by the congressional Office of Technology Assessment. The report contradicts a position taken by the Department of Health and Human Services (HHS), which a year ago gave the area a provisional stamp of approval. The report's conclusion is sure to keep in limbo the future of 182 families still living in the Love Canal neighbourhood and the 270 families waiting to buy homes there.

The report says that a 1980 study conducted by the Environmental Protection Agency (EPA) was 'inadequate' and that with current information 'it is not possible to conclude' whether the Love Canal area is safe. Based on the same EPA study, HHS declared Love Canal livable, provided that the ongoing cleanup of toxic chemicals was pursued and that monitoring was continued.

Stating that its confidence in the EPA study was 'low', the technology office faults it on several counts. It complains that the sampling of soil was uneven, that too few samples were collected overall, and that the controls were inadequate. And even when sampling in specific sites did seem sufficient, the contract laboratories conducting the analysis 'showed wide variability in performance', according to Raymond Kammer, deputy director of the National Bureau of Standards, who was quoted in the report.

The technology office suggests that Love Canal could be reinhabited using a 'paced, cautious approach' if certain problems were addressed. But given the difficulty of satisfying the criteria, it seems unlikely that revitalisation of the community will occur anytime soon.

The report concludes that the situation at Love Canal dramatically highlights the long-term need to develop federal standards that define when an area is safe—especially as more and more contaminated sites around the country are discovered.

Pollution is on tap in Silicon Valley, *New Scientist*, July 21st 1983.

America's new generation of high-tech firms are breeding new worries over pollution from toxic chemicals that leak into underground water supplies.

Toxic wastes from the industry's underground storage tanks is threatening water supplies in several communities in and around Silicon Valley, an area of some 200 sq.km, south of San Francisco. Solvents, gases and acid used in etching and

cleaning chips have permeated the area's groundwaters. The industry that can mount an electronic brain on a pinhead cannot stop its tanks from leaking.

Ten private and public wells in south San Jose have been closed. As yet there is no suggestion of widespread contamination of drinking waters, which are drawn from deeper strata.

Nobody knows the extent of the contamination, nor whether new regulations will stop the problem worsening. Nobody is guessing whether the chemicals that have already escaped will slowly percolate down and poison water supplies.

The first casualty of the clampdown on the new pollution is the Fairchild Camera and Instrument Corporation of San Jose, where a leaking underground tank was first discovered in December 1981. A well 600 metres away, which supplied 16,500 households, was contaminated with 1,1,1-trichloroethane, a degreasing solvent that can damage the central nervous system, liver and heart.

Since the Fairchild incident, local water officials have asked other companies to check for leaks. So far, 67 companies have found contamination. There is at least one new discovery every week.

The microelectronics industry also shares the blame for adding to California's smog through emissions of solvents into the air. The pollution comes from emissions and evaporation during processes that strip impurities from silicon wafers and semi-conductor chips and etch microscopic electrical circuits onto the chips.

The industry has been told to cut emissions of solvents by 3.4 tonnes per day using carbon filters, incineration plants and changes in methods of manufacture. The regulations will cost \$10-14 million to implement.

Killer cocktails, Troth Tiranti, *New Internationalist*, July 1983.

Millions of freshwater fish in Thailand have flipped their fins for the last time in the country's worst man-made ecological disaster. According to the fisheries department the likely cause of death is pesticide poisoning.

Fish is the main source of protein for rural Thais.

The fish deaths began in Suphanburi province—precisely where new methods of rice cultivation are being used which call for large quantities of herbicides. Such products as paraquat and farraden have been found in the dead fish—chemicals which lower the fish's resistance to parasitical diseases and fungi.

In the natural environment fish rarely get sick—unlike those in tanks. If one place doesn't suit they go somewhere else. "But this time there was no better place to migrate," said Dr Sitdhi Boonyaratpalin, chief of the fish disease unit. "Even snail, shrimp, crab and eel were affected."

There have been two other outbreaks of fish deaths in Thailand recently. In both cases, paraquat and dieldrin were found in high levels in the water, and in sediment and fish samples.

The British manufacturer of paraquat, ICI, claims that the chemical should not get into water because it normally concentrates in and combines with the soil. But Dr Thiraphun Bhukasawan, director of the National Inland Fisheries Institute, said that an ICI representative recently admitted that the paraquat marketed by ICI in Thailand and other developing countries—paraquat W—is a different formula from the paraquat sold in Europe and North America, known as paraquat S. What the difference is, ICI isn't saying.

ICI representatives told the Thai fisheries department that they had a report from the United Nations' Food and Agriculture Organisation saying that paraquat was not toxic to fish. The fisheries department, who weren't given the chance to look at the paper themselves, speculate that it may refer to the less dangerous paraquat S.

The only study on the long-term toxicity of paraquat, said Dr Prayoon, came from a US commercial testing laboratory and was found to be fraudulent by both the US Federal Bureau of Investigation and the US Environmental Protection Agency.

Germany calls for controls on acid rain, *New Scientist*, June 9th 1983.

West Germany wants to drag its partners in the European Community towards a common strategy to combat acid rain. The West German plan has been written jointly with Switzerland (a non-EEC nation) and is backed by Denmark. It calls for a 30 per cent reduction in sulphur emissions by 1993. The West Germans have taken a lead after discovering that many of their forests (including the Black Forest) appear to be dying from acid poisoning. New laws controlling sulphur emissions will be adopted in Germany in July.

Other proposals in the German plan are to extend the monitoring of 'transboundary air pollution' across Europe and to develop flue-gas desulphurisation and fluidised-bed combustion as ways of removing sulphur fumes before they leave power station chimneys. The German plan will be presented at a European summit next week.

Starvation threat to 65 nations, Henry Stanhope, *The Times*, June 17th 1983.

More than half of the world's developing nations will be unable to feed their people by the end of this century, according to a United Nations survey.

As many as 31 of the 51 countries in Africa are likely to be in trouble, while in South-West Asia, where the problem is most intense, only one out of 16 states will manage on its own.

Data about soils and climate in 117 lands was fed into a complex computer programme to produce the 'grim conclusion'.

About 65 Third World countries will be unable to produce enough food if their agriculture remains at the level of 'peasant farming'. But the position of 19 of them would remain critical even if they switched to high-intensity methods with modern fertilizers, pesticides and machinery.

Tough new asbestos law sought, Annabel Ferriman and Geoffrey Lean, *The Observer*, July 31st 1983. Safety officials are pressing for tighter controls on asbestos.

They want a total ban on the import of the two most dangerous kinds of asbestos, blue and brown, and stricter rules for workers using the white form.

A crucial meeting of the Health and Safety Commission will consider two controversial reports on the problem.

One, by Professor Donald Acheson, who is about to become Chief Medical Officer at the Department of Health and Social Security, calls for a ban on the import of all products containing blue and brown asbestos. It also calls for the use of white asbestos, the main form of the mineral used in this country, to be curtailed as substitutes become available.

The report was published amid charges from Professor Acheson that a summary of the report had apparently been suppressed.

He said that he had approved a press notice to go out with the report which had not been used, with the result that the report had had a more limited impact than expected. Distribution of the report to journalists had also been curiously patchy, he said.

The second report, by Mr Steven Grant, the Scottish area director of the Health and Safety Executive, has not yet been published. It says that safety levels of asbestos in the workplace should be tightened. Members of the commission objected strongly to its content, saying that the author had exceeded his brief.

The Acheson report reviews all the medical evidence produced since 1979 on the effects of exposure to asbestos.

It says experts now agree that the greater the exposure to white asbestos, the higher the risk of lung cancer. Two studies have also found an increased risk of cancer of the larynx, but the evidence of a link with cancer of the alimentary tract has weakened.

Unresolved suspicions linking asbestos with ovarian cancer have also been raised, they say.

Professor Acheson said "The use of white asbestos should be phased out because it is known to be carcinogenic in some circumstances.

Germans speed up ban on lead in petrol, *The Times*, July 21st 1983.

After failing to bring about European agreement, the Cabinet of Chancellor Helmut Kohl has endorsed plans to make unleaded petrol and catalytic converters compulsory in West Germany after January 1, 1986.

"The Chancellor does not want to act along the convoy system, which has the slowest dictate the speed", a government spokesman said. This was an obvious reference to objections by European community countries like Italy and France, who oppose the move because they consider it too expensive for their motorists.

Industry sources estimate the catalytic converters will make petrol engine cars more expensive by about £250. Diesel engines do not need converters.

Opening up the isle of death, Peter Macaulay, *The Sunday Times*, July 24th 1983.

The Ministry of Defence believes that field trials could lead to the decontamination of a small off-shore island which was written off as uninhabitable for thousands of years after wartime experiments there with deadly anthrax spores.

Access to the island of Gruinard has been strictly prohibited for over 40 years. But scientists are now injecting a solution of formalin—a preparation of formaldehyde—and sea-water into the ground over a 100-square-metre area to attack the spores which, in some parts of the island, lie several feet beneath the surface.

According to a ministry spokesman, formalin proved a 'complete success' in laboratory tests carried out at the Chemical Research Establishment at Porton Down in Wiltshire, killing anthrax spores 'stone dead'. He admitted that one of the effects of the chemical is to kill all vegetation. But he argued: "Temporary loss of vegetation would be a small price to pay for the removal of anthrax once and for all."

Shelved report on British diet can be published, Andrew Veitch, *The Guardian*, July 4th 1983.

A controversial report on diet and health prepared two years ago may be published at last.

The report which concluded that the British diet was unhealthy was drawn up by a subcommittee of the government-appointed National Advisory Committee on Nutrition Education under Professor Philip James.

The Sunday Times disclosed on July 3rd that Professor James's recommendations for cutting fat, sugar and salt have been opposed by the British Nutrition Foundation, which is financed by the food industry, and by a senior Department of Health official.

More than 170,000 people a year die from diseases of the heart and circulation in Britain at a cost to the National Health Service of more than £250 million. There is widespread agreement among doctors and scientists that one of the few hopes of improvement lies in improving the nation's diet.

Professor James' report recommended that the British diet should contain 10 per cent less fat, 10 per cent less sugar, 8 per cent less salt, 30 per cent more bread, 30 per cent more potatoes, 30 per cent more fresh fruit, and 30 per cent more fresh vegetables. This would markedly reduce the market for sweets and processed foods.

Professor James's report was supported by the national advisory committee's chairman, Professor Jeremy Morris of the London School of Hygiene.

The British Nutrition Foundation's chairman, Dr Alan Robertson, is reported to have said there was insufficient evidence to support the recommend-

ations, and Dr Derek Shrimpton, director of the foundation, was quoted by *The Sunday Times* as saying the report would not be published by the National Advisory Committee.

Comments by the Department of Health suggest that it will not publish it either, though Professor James is free to do so.

CEGB promises to strip asbestos from stations, Penny Chorlton, *The Guardian*, July 29th 1983.

Disused power stations containing dangerous amounts of asbestos will be stripped of the substance before they are sold to contractors for demolition, the Government and the Central Electricity Generating Board have announced.

The policy change, which follows concern about power stations demolished by inexperienced contractors releasing dangerous amounts of asbestos dust into the air, was announced by Sir Walter Marshall, chairman of the CEGB and by the Health and Safety Minister Mr John Selwyn Gummer.

Fulham power station has been at the centre of concern and work there was stopped for the second time earlier this week.

Sir Walter said yesterday that the change could cost up to £1 million a station.

"We have to balance that financial disadvantage against the understandable concern of the general public," he said. The cost would be passed on to the electricity consumers, not the developers who bought the sites.

Cancer probe anger, Paul Lashmar, *The Observer*, July 24th 1983.

Veterans of the British nuclear test programme of the 1950s have been angered by a statement by the Ministry of Defence that a survey into cancer deaths among servicemen who were at the tests will take two to three years to complete.

Mr Ken McGinley, chairman of the British Nuclear Test Veterans Association, said he believes the Ministry is using the survey as a delaying tactic to stop servicemen who have become ill as a result of being at the tests obtaining compensation.

The Defence Ministry has maintained that no serviceman received sufficient radiation to cause illness. The Ministry also announced that the survey was to be extended to cover the 20,000 men who are now believed to have been present at the tests.

In a written parliamentary answer to Labour MP Frank Allaun last February, the Prime Minister said that 12,000 servicemen and 1,500 scientists were present at the tests between 1952 and 1958.

The Defence Ministry has admitted that officials have not yet established exactly who had been at the tests and have not yet passed the records to the National Radiological Protection Board, which is to conduct the survey.

Mr McGinley said his association is worried that the Government is increasing the figures in order to lessen the impact of any illness statistics.

Rise in science frauds, Robin McKie, *The Observer*, July 17th 1983.

The ultimate scientific crime of fabricating and stealing results is on the rise. An alarming number of researchers have recently been exposed as cheats.

One British researcher quit his university post after admitting making up results, while in America a steady stream of promising scientists have been revealed as charlatans. It is a disturbing trend, although there is nothing new in scientific fraud. It is the rise of the career scientists which has sharply accelerated the deception.

"Few scientists today can leave it to posterity to judge their work," according to William Broad and Nicholas Wade, authors of a new book on scientific fraud, *The Betrayers of Truth* (Century, £9.95).

"Their universities may deny them tenure, and the flow of grants and contracts from the Government is likely to dry up, unless evidence of immediate and continuing success is forthcoming."

This can lead to the start of the 'tidying up' of results. It can end in wholesale fraud as scientists battle to get articles published, to secure grants and to win prestigious prizes.

One researcher in the United States, Dr Elias Alsabti, stole and reprinted the work of others for years. Not until he cavalierly stole an entire paper, which he repeated word for word, did he bring about his own downfall.

It seems scientists are as susceptible as others to persuasion, flattery, rhetoric and propaganda—yet scientific authorities deny that fraud is anything more than a passing blemish, claim Broad and Wade.

Agent Orange secret is out, Joyce Egginton, *The Observer*, July 10th 1983.

For at least five years of the Vietnam war, between 1965 and 1970, several American chemical companies shared a conspiracy of silence about their discovery that the herbicide 'Agent Orange', which they supplied to the US military, was likely to be contaminated with dangerous amounts of dioxin.

The revelation came with the release of secret documents by a federal court judge in New York, who is hearing preliminary arguments in the lawsuit filed on behalf of 20,000 US veterans of the Vietnam war.

The newly released documents, which include inter-office memoranda by senior employees of the companies, provide the strongest evidence to date that over a period of years several chemical manufacturers were aware of the human health hazards of Agent Orange but kept the knowledge to themselves while continuing to produce the pesticide.

According to the documents, about 50 workers at the Dow Chemical Company of Michigan, the leading supplier of herbicides used over South-East Asia from 1962 to 1970, suffered an outbreak of chloracne in 1964, when their war contract called for increased production of Agent Orange.

Subsequently, Dow researchers ran some tests on laboratory animals and became more concerned when they found that heavy exposure to dioxin could result in death.

In March 1965, the documents related, Dow invited officials of other companies manufacturing Agent Orange for the military to a secret meeting at which they shared this information. At this meeting Dow's representatives urged other manufacturers to keep the dioxin contamination to the lowest possible level. Dioxin can be inadvertently produced in the manufacture of 2,4,5-T, a main ingredient of Agent Orange.

The court documents revealed that this was known as far back as 1957 when the West German chemical company of C. E. Boehringer Sohn sent a memo to Dow and other 2,4,5-T makers, pointing out that there was 'a dreaded substance X' which might appear as a contaminant of the pesticide.

According to one Dow memorandum, this revelation 'was filed and forgotten'.

US military officials have claimed that the first they heard of the dioxin contaminant in Agent Orange was in 1970.

Nuclear Power: Bombs, Accidents, and the Arms Race

Opponents dispute cheaper power theory, Pearce Wright, *The Times*, July 23rd 1983.

If the Sizewell B nuclear plant on the Suffolk coast is built, it will increase electricity prices rather than cut them, according to the Electricity Consumers Council.

The claim was made by Mr Michael Barnes, chairman of the council.

His assertion is part of an assault on the economics of the project, which is being mounted by advisers to the Electricity Consumers' Council, the Council for the Protection of Rural England and the Stop Sizewell B Association.

A 12-man team of American nuclear engineers is working in Britain on designs for the Sizewell station, paying special attention to the cost of the power which it would produce. It is acting for the National Nuclear Corporation (NNC), which will build the plant if permission is granted.

The team is headed by Mr Christopher Judd, a designer who began his career in nuclear engineering with the US Navy Polaris submarine programme.

He has been seconded with his team from the Bechtel engineering and construction combine.

The team's work is directly relevant to the most ferociously disputed issues of the inquiry: the claims by the CEBG that electricity prices would be cheaper because of the power station's relatively low capital cost, the short time needed to build it, its high operating efficiency and a predicted long life-time.

A serious discrepancy in any of those items would leave the CEBG's case in tatters.

The arguments of the objectors are based on the experience of the PWRs in America and the construction record in Britain for building other types of large power stations.

Since the start of the inquiry, the original estimate of £1,147m to build Sizewell has risen by more than £50m, because of the delays in convening the public inquiry. Moreover, the hearing is taking longer than expected.

The CEBG's bullishness over the matter is illustrated in its estimate of a building time of 84 months. The average time for building PWRs in the US is 102 months.

Bechtel designed or built 50 of the 147 nuclear stations in the US which are in operation or nearing commission.

The firm estimates that about one third of its income is from nuclear projects, but there has been no new order for a nuclear power station in the US since 1978.

US ships 'leaked radiation', *The Guardian*, July 21st 1983.

US Navy ships have leaked radiation at least 37 times since they began using nuclear reactors, contaminating coastal and inshore waters off Japan, Britain and the US on more than a dozen occasions, according to a report released by the Fund for Constitutional Government, a private research group.

It accused the US Navy of "suppressing information about a 30-year-long history of radiation accidents and safety problems". The Navy says it has a perfect record of reactor safety.

Among the incidents listed was one in Apra Harbour, Guam, in 1975, when a disabled submarine tender discharged highly radioactive reactor cooling water into the harbour. Shortly afterwards, radiation levels in the water near two public beaches were measured at 50 times the allowable dose, a Navy technician testified.

Radioactive caesium found off Greenland, *Pearce Wright*, July 11th 1983.

Radioactive caesium, discharged by British Nuclear Fuels' reprocessing plant at Sellafield, formerly Windscale, has been detected in the north polar currents east of Greenland.

The concentrations are one thousandth of those measured at the discharge outlet into the Irish Sea.

The discovery that the radioactive caesium is carried into Arctic waters is reported by scientists from the Riso National Laboratory, Denmark, and the University of Lund.

The material is carried from the source around the north of Scotland, across the North Sea to merge with the Norwegian-Atlantic current that moves close to the Norwegian coastline.

Then it veers west, between Norway and Iceland,

and continues north to mix with the east Greenland polar current. The journey takes six to eight years.

Since the mid 1970s, discharges of radioactive caesium in the Irish Sea have increased the levels of radioactive material in the North Atlantic.

Reagan prepares to battle over America's nuclear breeder, Christopher Joyce, *New Scientist*, August 4th 1983.

America's troubled breeder reactor project at Clinch River in Tennessee is too important to ditch, say executives from the nuclear power industry. They have apparently won President Ronald Reagan and former sceptics at the White House over to their side.

At a meeting to announce a plan to garner the \$2.5 billion needed to build the country's first commercial breeder, a government spokesman said Reagan is 'determined' to finish the 350-megawatt plant. The US has spent billions of dollars and has a blueprint, some components and a hole in the ground to show for it. Last December, an impatient Congress came within one vote of throwing in the towel. Opponents argued that the design, based largely on existing American fission reactors, is outdated, and that the power it generates will go unused. The project has limped along because of the efforts of one senator, Howard Baker, who wants the breeder built in his home state of Tennessee.

Now comes the Breeder Reactor Corporation (BRC), a collection of private companies which has spent \$150 million on Clinch River. With its final offer, last December, Congress demanded a plan from the BRC for industry to share the monumental costs of finishing the reactor. In March, the consortium failed to impress legislators with a scheme that put the risk almost totally on the taxpayer. In July the corporation offered essentially the same plan.

The nuclear industry hopes to attract \$675 million by selling bonds to investors; to draw another \$150 million in tax writeoffs that accrue to investors who buy those bonds; and to spend \$175 million of its own money (which it promised the government in 1971 anyway). The industry will run the reactor and sell power to pay back the investors.

The catch, however, is that the government must guarantee against failure for any reason—higher costs due to delays in construction or licensing, a low demand for energy, or other mishaps common to nuclear projects even less risky than the nation's first commercial breeder. But if Clinch River succeeds, the companies take the profits.

According to one analyst in Congress, private industry would end up paying about 9 per cent of the total cost. Critics call the plan a sham that clearly shows that nuclear companies and their financial backers are not confident enough in Clinch River to risk their own money.

Congress must decide by October. One congressional analyst predicted: "There will be blood on the floor."

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