

The Ecologist Digest

Nuclear Power: Bombs, Accidents and the Arms Race

Nuclear Leak Concealed by Japanese Company, *The Times*, April 22nd 1981: 56 Workers Exposed to Radiation Leak, *The Guardian*, April 22nd 1981.

The Japan Atomic Power Company failed to report the leak of 40 cubic metres of radioactive sludge, which flowed over the top of a filter tank at their nuclear power station near the town of Tsuruga, for 42 days. The leak was discovered after scientists reported a high level of radioactivity in the seabed of Tsuruga Bay and subsequently it was revealed that radioactive material had flowed onto the floor of the power station for three hours after a worker forgot to close a valve on the filter tank. Fifty-six workers were exposed to radioactivity, receiving an average dose of 10 millirems and a maximum dose of 155 millirems. Investigations indicate that the level of radioactive Cobalt-60 in the mud of Tsuruga Bay rose to 13,000 picocuries per gram of mud. Residents in towns near the power station refused to buy fish and other seafood from local markets and groups of fishermen have announced that they intend to sue the Japan Atomic Power Company for a loss of livelihood. A spokesman for the Ministry of International Trade and Industry — the body responsible for overseeing Japan's nuclear industry — declared, "This is an unprecedented grave incident which could retard our programme to build more nuclear power stations." During the accident workers were told to collect the spilled wastes in buckets.

Atomic Bomb Research Suggests Greater Cancer Danger From Low-Level Radiation, Anthony Tucker, *The Guardian*, May 25th 1981: New A-Bomb Studies Alter Radiation Estimates, Eliot Marshall, *Science*, Vol. 212, May 22nd 1981.

Low-level radiation may be three to five times more dangerous as a promoter of cancer than is now believed, according to a new and detailed reassessment of the effects of the atomic bombs dropped on Hiroshima and Nagasaki in 1945. The reassessment was carried out by the US Government's Lawrence Livermore Laboratory near San Francisco. The new findings are far from welcome for the government as all the revisions are, as one consultant puts it, "moving in the wrong direction". The study suggests that most of the cancer caused by the atomic bombs came from low LET (Linear Energy Transfer) gamma rays, suggesting that this common type of radiation

is more hazardous than previously assumed. Until recently it had always been assumed that the damage done by the bombs was caused by high LET neutron radiation but the Livermore figures show that the amount of neutron radiation released has been grossly overestimated. For example, the neutron radiation at a distance of 1180 metres from the epicentre of the blast appears to have been overestimated by a factor of 6 to 10. If this research proves correct — and it has been through the rigours of a number of peer reviews — it will mean that many of the current radiation standards will have to be rewritten. The significance of the report will not be lost on the nuclear industry — most of the radiation from nuclear reactors, for example, comes in the form of gamma rays. "The implications are far reaching for health regulation and nuclear power (in the USA) in general," says David Auton, a physicist in the office of target and damage assessment of the US Defence Nuclear Agency. As he describes the situation, the health physics community faces a nasty dilemma if the new bomb data are accurate. On the one hand, if the standard-setters adhere to the theory that it was the neutrons which caused the damage, then the knowledge that the number of neutrons present in the blast is smaller than previously thought means that their devastating effect must be accounted for by increasing the estimate of their potency. The resultant killing power of neutrons is 'incredible', says Auton. Industrial safety rules would have to be revised, reducing exposure limits for neutron radiation to one-tenth of the present limits. For critical jobs, companies would have to employ ten times as many people. On the other hand, the health physics community may abandon its 'neutron' principle, in which case it would have to assume that gamma radiation was responsible for nearly all the cancers in Hiroshima. That would mean that the effects of gamma rays at relatively low exposures — five to 200 rads (the lifetime permitted dose to external radiation in industry is 200 rads — that is about five rads a year for 40 years) — are substantially greater than has hitherto been believed.

Monopolies Attack on CEGB Investments, Nicholas Hirst, *The Times*, May 21st 1981: Criticism for Electricity Board's Buying Policies, John Andrews, *The Guardian*, May 21st 1981.

The way in which the Central Electricity Generating Board has assessed its investment for new power stations is against the public interest, a report from the Monopolies and Mergers Commission has concluded. The commission was particularly critical of the CEGB's presentation of its case for nuclear power, which put forward highly optimistic esti-

mates of performance on site and for the likely level of capacity usage when built which, with other assumptions, led to the view that nuclear stations were worth building on cost grounds even if they were not needed to meet additional electricity demand. Heysham II, the latest nuclear power station to be ordered, was commissioned (according to the CEBG's evidence to the Monopolies Board) on 'strategic grounds'; in other words to keep British nuclear manufacturers in business and protect the country against the rising cost of imported fuel. The Commissioners, however, say: "We are seriously concerned that the strategic case of Heysham II order may have been unjustifiably reinforced by the supposed economic merits of the project." That concern leads the commission to say that the CEBG is proposing a large nuclear programme "on the basis of investment appraisals which are seriously defective and liable to mislead" and concludes: "The Board's course of conduct in this regard operates against the public interest in respect of its internal cost control and project control system, its management information systems or its methods of stock control."

£96,000 Payout for Windscale Cancer Victims, Amit Roy, *The Daily Telegraph*, June 9th 1981.

British Nuclear Fuels is to pay compensation totalling £96,000 in an out-of-court settlement for three cancer victims at the Windscale reprocessing plant. Two of the victims died of leukemia and cancer of the pancreas respectively, whilst the third (who still works at Windscale) had had operations for cataracts in both eyes and the removal of a tumorous kidney. British Nuclear Fuels do not accept responsibility for the cancers but the company says it agreed to pay compensation in order to avoid 'the trauma of a lengthy court hearing', and because it wanted to behave 'like a good employer.' A spokesman for BNFL, explaining why compensation was being given although the company disclaimed liability, said: "There is some evidence of a casual relationship between cancers and radiation at high dosage."

US Nuclear Power: Costs Disputed, David Dickson, *Nature*, Vol. 290, April 30th 1981.

Efforts to meet the safety problems created by nuclear power have already made nuclear energy considerably more expensive than electricity from modern coal-fired stations. And the gap is likely to increase at least until the end of the decade according to a report published by independent energy economist, Charles Komanoff. The nuclear industry has reacted sceptically to Komanoff's predictions. However, Komanoff is standing by his figures. He points out that similar scepticism greeted a prediction he made five years ago that the nuclear industry would be operating at only 55 per cent of capacity through to the end of the 1970s, a figure which has turned out close to the truth. He also says that the argument about coal being

cheaper than nuclear energy is supported by figures published by the Atomic Industry Forum. In a report issued in February 1981, the industry group estimated that the electricity from the three nuclear plants which started operation in 1978 cost 2.5 cents per kilowatt hour to produce, compared with 2.0 cents for coal and 5.7 cents for oil. Komanoff bases his future projections on the cost of obtaining electricity from coal-fired plants by assuming that increasingly stringent controls will require the use of scrubbers to remove sulphur dioxide — devices that can consume up to 25 per cent of the capital costs of a new plant and that the cost of coal will increase at a rate about 2 per cent higher than that of inflation. On this basis a coal plant will increase in capital cost from \$583 to \$794 per kilowatt hour of generating capacity in 'constant' dollars. In contrast, extrapolating on past trends in the rising costs of nuclear power plants due to the need to include increasingly stringent safety precautions, Komanoff predicts that the cost will rise from \$887 to \$1,374 per kilowatt hour of capacity. Whatever criticisms have been raised about the report, however, everyone is agreed that the immediate prospects for the US nuclear industry are bleak. Only 13 new power plants have been ordered in the US since 1975 and plans for 50 plants have been cancelled — many because of decreasing projections of future energy needs.

France Under Mitterand Thinks Again About Nuclear Policy, *New Scientist*, June 4th 1981.

France's socialist government has backed its pre-election promises with signs of a rethink on nuclear power. The four 1300 Megawatt light water reactors at Plogoff in Brittany will not now be built. And in the military domain the new government has suspended the nuclear test programme at Mururoa in the Pacific Ocean. The Plogoff decision was expected. But the announcement has not gone down well with the new energy secretary, Georges Lemoine. He reacted to the announcement by saying that Plogoff had gone into 'cold storage' until the debate on energy policy had run its course. Although Mitterand's Socialist Party has promised to delay work on all new nuclear power stations pending a parliamentary debate on nuclear policies, much depends on how the government defines a 'new' site. Preliminary civil-engineering work — though no major building — has started at about ten sites. It is not clear whether work at these installations will be stopped in the event of a moratorium.

Safety At Windscale: Yes We Were Wrong, *Nature*, April 16th 1981.

British Nuclear Fuels' reprocessing plant at Windscale has been given another slap on the wrists by the Health and Safety Executive, the organisation in charge of the Nuclear Installations Inspectorate. And BNFL has put its hands on its heart and acknowledged that it had been at fault. The HSE report says that BNFL allowed the condition of the several plants at Windscale to deteriorate until by the early

1970s, their safety could not be assured: and that the efforts made since 1974 to enhance the safety of the Windscale facilities further complicated the assurance of safety by their demand on resources. The report also says that most incidents at Windscale have arisen because of mistakes in the execution of routine tasks. About a quarter of the 30 or so incidents reported each year since 1976 have involved the exposure of people to doses of radiation exceeding the limits laid down.

Doctors Unite Against Nuclear War, *New Scientist*, April 2nd 1981.

A group of doctors, International Physicians for the Prevention of Nuclear War, have pledged to fight against the arms race. The doctors warn that it is futile to imagine a habitable world after a fully-fledged nuclear exchange. The Soviet cardiologist, Dr E. Chazov, told the inaugural meeting: "Statements appear that a nuclear war can be won, that a limited nuclear war can be waged, that humanity and the biosphere will still persist even in the conditions of total nuclear catastrophe. This is an illusion which must be dispersed." Unlike Hiroshima and Nagasaki, there would be no help from the outside should nuclear war break out, the doctors explained. Medical care for the 300,000 wounded and burned (a number equalling the dead) if a one megaton bomb were to hit a major city would not be available for weeks, if at all, since 80 per cent of the physicians would be killed and most of the hospital drugs and blood supplies would be destroyed. Dr Patricia Lindop, Professor of Radiobiology at St Bartholomew's Hospital in London, pointed out that radiation released from the detonation of the world's nuclear arsenals, if spread equally worldwide, would give the world's population a dose of about 400 rems. That's within a factor of two of the dose that gives 100 per cent mortality. Should a bomb fall on a nuclear power station, the radiation released would by many times that dispersed by a bomb alone and that radiation would also last longer. Moreover damage to the ozone layer could greatly increase ultraviolet radiation.

Chemicals, Drugs, Health and Pollution

PCBs in Mothers' Milk, *Environment* (Spectrum section), Vol. 23, No. 2.

PCBs have been found in every sample of breast milk from 1000 nursing mothers in Michigan, according to a study reported in the *American Journal of Public Health*. Amounts of the chemical present in the milk varied from a trace to 5 parts per million (ppm); the average was 1.5 ppm. Although PCBs are a known carcinogen, the effect of small quantities of PCBs on

human infants is unknown. Nonetheless, if cow's milk contained levels of PCBs as high as 1.5 ppm, it could not be sold.

An Overburden of Toxic Wastes, Catherine Caufield and Fred Pierce, *New Scientist*, May 7th 1981.

The villagers of five hamlets in Derbyshire fear that they may be living on top of a British Love Canal. Somewhere beneath their land is buried the dioxin produced in the explosion at Coalite's Bolsover plant in 1968. After the explosion, the Bolsover chemical plant was dismantled and the contaminated rubble was buried. But the local authorities will not say (or do not know) where the dioxin was dumped. In 1976, in the wake of concern over the Seveso tragedy in Italy, the Derbyshire County Council's then chief scientific officer, Joe Markland, compiled a secret report which claimed the dioxin posed little risk to the public if it was not disturbed. Markland did not know where the dioxin was buried and never asked Coalite for the location of the site, relying on the company's assurances that the dump was impermeable. According to the chief executive officer of the Council, Neil Ashcroft, the Markland report was submitted to the leader of the county council and others who decided that the location of the site should not be revealed in order to 'avoid causing unnecessary public concern'. That account of events was made by Ashcroft in a letter to local MP, Dennis Skinner, but Ashcroft now admits that he lied — there was no meeting with councillors and the decision was taken by council officers without the sanction of elected councillors. It now appears that nobody in the council knows exactly where the dioxin lies, although it is believed to have been dumped in a former open-cast mine covered over in 1969. The local authorities and the Severn-Trent Water Authority are both accused of misleading the local villagers about the dangers of the dump-site. The dioxin controversy has been compounded by accusations that a company operating a waste site next to the old open cast mine have regularly violated the conditions of its licence.

London Will Fail EEC Air Pollution Standards, *New Scientist*, May 14th 1981.

London's air will be too polluted to meet European Community standards when they come into force in 1983 unless the capital's industry uses less high-sulphur fuel oil and the government clamps down on inefficient diesel engines. But the government wants to avoid taking what it considers the drastic steps of banning high-sulphur fuels and tightening vehicle emission controls. The EEC Directive on Sulphur Dioxide and Suspended Particulates issued last year sets limits — which must be met by April 1 1983 — on the combined amounts of SO₂ and smoke allowed in the air. Although over 93 per cent of buildings in London are covered by smoke control orders, combined SO₂ and smoke emissions exceed EEC limits in many parts of the city.

Technology Used to Evade Checks on Processed Meat, Arthur Osman, *The Times*, June 15th 1981.

A report to the Shropshire County Council's public protection committee accuses some unscrupulous manufacturers in meat and meat products of using technology in such a way that analysts are unable to detect debasement. Dealing with the specific legislation requiring minimum standards in certain foods, such as beef sausages having to contain a minimum of 50 per cent meat, the report said: "In checking to see whether there is sufficient meat and meat protein in the product, the analyst makes a calculation based on the amount of nitrogen present. Unfortunately the technology in some cases simply does not exist to enable him to differentiate between the nitrogen from meat contained therein and nitrogen therein from non-meat sources." Canned ham, a household brand name, had been found to be adulterated with urea. Natural urea was the nitrogenous waste found in the urine of animals, although in the samples examined it had almost certainly been made synthetically. "Urea has no nutritional value to man whatsoever and had been incorporated into the product for one reason only — it simply added nitrogen so that what appeared on initial analysis to be mainly ham with 84.6 per cent of meat was in fact ham and urea with only 72.7 per cent meat." Another company with a household name sold a chicken product which was made from chicken necks and stripped carcasses and the analyst said it had very little tissue and he found feather fragments.

Are Hospitals Becoming Too Dangerous? Tony Smith, *The Times*, April 16th 1981.

A survey of iatrogenic (doctor-inflicted) illness among 815 patients treated in the University Hospital in Boston has been published by the *New England Journal of Medicine*. Just over a third of the patients had one or more illnesses due either to the drugs they were prescribed or the procedures they underwent. Seventy-six patients became seriously ill from complications of their treatment and in 15 these complications contributed to their deaths. Thirty of the 290 patients with iatrogenic disease died as compared with only 33 of the 525 with no complications. Among the drug side-effects commonly seen in hospital patients are bleeding due to interference with clotting factors or damage to the bone marrow, irregularities of the heart beat, lowered blood pressure causing fainting and falls, mental disturbances and a whole range of hospital infections including the notorious legionnaires' disease. Some of the specialised x-ray investigations (such as cardiac catheterization which requires a thin

plastic tube to be threaded through an artery in the leg and into the heart) can cause strokes or even death; while removal of specimens of lung, liver or kidney through narrow needles can cause internal bleeding. Not surprisingly, the longer patients stay in hospital the more likely they are to become ill, while the risk also multiplies with the number of drugs prescribed. In this latest study, patients who became seriously ill from drug side-effects had on average each been prescribed 17 drugs and some had had over 25.

Agriculture

US Study shows that 'Back to Nature' Farming Makes Sense, *New Scientist*, March 1981.

Organic agriculture gets high marks for productivity and efficiency from the US Department of Agriculture after a year-long study of 69 farms in 23 states. The report coincides with the end of a five-year comparative study by the Centre for the Biology of Natural Systems at Washington University, St. Louis, of 51 conventional and organic farms in the Mid-West corn belt. The Washington University team found that organic farms had yields roughly equal to, and costs considerably lower than, conventional farms. According to the USDA report, the long-term and hidden costs of conventional agriculture have stimulated interest in organic farming. The report cites "the adverse effects of our US agricultural production system", including heavy reliance on expensive and limited supplies of energy and chemical fertilisers, a steady decline in soil productivity due to excessive soil erosion and loss of organic matter, and human and environmental health hazards from agricultural chemicals. The study found that organic farms, varying in size from 5 to 750 hectares, were in most cases 'productive, efficient and well-managed'. Contrary to popular belief, organic farmers 'have not regressed to agriculture as it was practised in the 1930s'. They take advantage of modern equipment, new crop varieties and advanced management and conservation practices. Not surprisingly, the USDA study finds that organic farms use less energy and more labour per unit of produce than their conventional counterparts. More importantly, they are also 2.5 times more productive per unit of energy consumed than conventional farms.