repurified its stock (leukocyte interferon is always contaminated with various other proteins besides interferon) and if the toxicity trials — to be performed on dogs — are completed successfully. This may take two months, he estimates.

There is anxiety, however, about non-French interferon, over which Flamant's council and the minister himself have little or no control. The council deals specifically and solely with IPP interferon because it arose as a *quid pro quo* when the government first offered a guaranteed market to IPP for its product. Having guaranteed the cash, the government also wanted to ensure proper statistical control of the trials and so established the council.

But non-French interferon enters the country with no more than an import licence — and some of it, it is suspected, without any licence at all. This foreign interferon is being used for phase 1 and phase 2 human trials without any control, and with little knowledge on the part of the ministry.

It is therefore being suggested that the foreign interferon material, and other experimental drugs as well, should be controlled under a comprehensive oversight scheme. Thus questions raised over the purity of a particular kind of French interferon may also affect other drugs, both French and foreign.

Robert Walgate

Anglo-Australian bomb tests

Government traces victims

Canberra

It seems that the dust has not settled over Maralinga or at a site 200 kilometres to the north of it called Emu, both in South Australia, nor over the Monte Bello Islands off the coast of Western Australia. It was in these remote spots that the British government conducted a series of 12 atom bomb tests between 1952 and 1957 (see table). In addition, in the following six years, weapon experiments involving radioactive fallout, though not from explosions, were undertaken at the testing range of Maralinga — an aboriginal word meaning "field of thunder".

The federal government is now trying to trace people associated with the tests, some 15,000 in all, in order to establish if there might be a link between mortality and morbidity of this group and the tests. On 22 October, the Minister for National Development and Energy, Senator Sir John Carrick, announced that questionnaires seeking medical data were sent to all the 8,000 people whose whereabouts are known through sifting administrative records, and he appealed for help to find the rest. The Department of National Development and Energy, which is conducting the survey, is also unearthing death certificates for information on the number and causes of death among this population. Furthermore, the government commissioned an independent body of experts, the Australian Ionising Radiation Advisory Council (AIRAC), to examine the adequacy of safety precautions at the time and the possibility of ill effects from fallout. This report, now in its final draft, was expected to be released in a month but it will now be delayed until next year, partly because it contains some classified information awaiting clearance by British authorities.

The survey is both a response to and an attempt to allay growing public disquiet in the past three years over newspaper reports, mainly from South Australia, of illness and death among servicemen involved in the tests. Another story, just as alarming, which may not be apocryphal, is about a tribe of the Pitjantjatara aboriginals wandering into ground zeros during the tests unbeknown to the British. An attempt by the South Australian Health Commission to authenticate that claim only served to highlight the difficulties of obtaining information from a small nomadic and dispersed group and the lack of control data for comparison.

Of the many compensation claims lodged at the office of the commissioner for employee compensation, liability has been acknowledged in 5 cases — 3 for deaths from cancer, 1 for the aggravation of an existing nervous complaint, and 1 for a thyroid disease. The largest sum, A$32,000, was paid to the widow of Mr Frank Eaglen who died of cancer. Claimants are aided by the fact that the onus of proof rests with the government.

Australia and the United Kingdom agreed to establish a testing range at Maralinga in August 1954 and it was approved by cabinet in May 1955. Subsequently the Atomic Weapons Safety Committee was instituted, whose job it was to ensure that the tests were conducted to the satisfaction of the Australian government. This committee of scientists had the power to veto, until the moment of firing, any test not meeting its safety criteria. After its closure, the range was partially decontaminated in 1964 and again in 1967 (operation "Brumby") by British teams. However, as a consequence of Australia's ratification of the nuclear non-proliferation treaty, Britain was asked to "repatriate" half a kilogramme of plutonium existing as a single discrete mass buried at Maralinga and the material was removed in 1979, the same year in which the Department of National Development and Energy completed a programme of waste management and rehabilitation in accordance with AIRAC recommendations.

Vimala Sarma

UK atomic tests in Australia 1952–57

Code	Location	Firing site	Date	Size
Hurricane	Monte Bello	Off Trimouille Island	3 Oct 1952	Kilotonne
Totem 1	Emu	—	15 Oct 1953	Kilotonne
Totem 11	Emu	—	27 Oct 1953	Kilotonne
Mosaic G1	Monte Bello	Trimouille Island	16 May 1956	Kilotonne
Mosaic G2	Monte Bello	Alpha Island	19 June 1956	Kilotonne
Buffalo	Maralinga	One Tree	27 Sept 1956	Kilotonne
Buffalo	Maralinga	Marcoo	4 Oct 1956	Low yield
Buffalo	Maralinga	Kite	11 Oct 1956	Low yield
Buffalo	Maralinga	Breakaway	22 Oct 1956	Kilotonne
Antler	Maralinga	Tadje	14 Sept 1957	Low yield
Antler	Maralinga	Biak	25 Sept 1957	Kilotonne
Antler	Maralinga	Taranaki	9 Oct 1957	Kilotonne

Source: Australian Ionising Radiation Advisory Council Reports Nos 4, 5 and 7 tabled in the House of Representatives on 30 May 1979, 13 November 1979 and 22 May 1980 respectively.

Radiation exposure

Unions agree

A scheme for compensating the dependants of radiation workers who have died from cancer has been agreed between British Nuclear Fuels Ltd (BNFL) and its trade and staff unions. The scheme will apply to present and past employees, but requires that dependants will be eligible for compensation only if there is evidence that the cancer may have been caused by occupational radiation exposure.

British Nuclear Fuels is the publicly owned monopoly for reprocessing and fabricating nuclear fuel. The distinctive feature of the new agreement is that compensation will be determined by the probability that a cancer has been induced by radiation, thus avoiding the "all or nothing" conundrum that has complicated earlier legal cases.

The scheme is hailed as a "pioneering deal" by Mr John Edmonds, National Energy Officer of the General and Municipal Workers Union (the main union involved in the negotiations). It is certainly a unique scheme in the nuclear industry, although large employers in other industries run compensation schemes that work along similar lines. Previous claims in respect of radiation-induced disease made through the courts have resulted in very long delays in payments; several substantial out of court settlements have been made.

The new procedure is voluntary, but the unions involved will recommend claimants to make use of the scheme. The option of taking a case to court instead is not

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excluded, and a compensation payment under the new procedure does not constitute an admission of liability by BNFL.

BNFL is to examine radiation dosage records of its employees at Sellafield (formerly Windscale) and its other plants, and will include employees of its predecessors in the field, the Atomic Energy Authority and the Ministry of Supply, going back to 1950. A BNFL spokesman, while emphasizing the company's continuing efforts to minimize radiation exposure among its employees, estimated that between 10 and 40 additional payments are expected immediately under the new scheme.

In difficult cases an independent panel of experts, jointly appointed by BNFL and the unions and under the chairmanship of Lord Gregson, will decide the level of compensation. The agreement is provisionally scheduled to last for two years and will be extended if it proves successful. It is also hoped that it might be possible to extend the scheme to cover cases in which radioactive material has been ingested (more difficult to assess for technical reasons) and cases of disablement. **Tim Beardsley**

EEC research council

British block safety reactor

Brussels

An otherwise successful meeting of the EEC's research ministers in Brussels last week was marred by some tough British objections to the new budget put forward by the Commission for the Super-Sara project. The project, which aims to explore ways of managing crises in light water reactors when loss of coolant takes place, is included in the new four-year (1982–86) programme for the EEC's joint research centres (JRC). Super-Sara will absorb a considerable part of JRC's budget at a time when efforts are being made to restructure its work so that it is more in line with other research and development aims of the Community.

Super-Sara was first proposed after the Three Mile Island accident and when the Italians wished to find a use for the Essor experimental reactor which was no longer being used at the Ispra Research Centre. Since then the enthusiasm of the rest of the member states, never very strong, has waned considerably as the original cost estimates have been continually revised upwards. British officials were predicting before Thursday's council that the project could be scrapped and even now its future is by no means certain.

A decision will have to be taken by Coreper, the committee of the member states' ambassadors, within the next two weeks before the revision of the 1982 budget is completed. Mr David Mellors, British Under-Secretary of State for the Department of Energy, has now asked the European Commission to present further details on how the increased project costs can be accommodated and has questioned whether the project, which he thought had been badly managed until now, could still be considered cost-effective.

Mellors said that the results that the project would yield could not be considered essential since it investigated only an extremely unlikely type of malfunction. The Commission has, however, received support from a task force of experts whose report concluded that the project was worthwhile and fitted into the matrix of research being carried out elsewhere. And even the United States has until now shown interest in contributing to the cost of the project. British opposition might be rooted in national interests because, having chosen to build pressurized water reactors, the United Kingdom will be only marginally interested in the results of the project.

Considerable confusion however, surrounds, the various estimates of Super-Sara's cost. An early estimate of 139.53 million European currency units to cover the project until 1988 has been constantly revised, standing now at 293.9 million units (£161.7 million).

European Commissioner Viscount Etienne Davignon told the ministers that 10 million ECU and 17.5 million ECU urgently needed to be taken from the 1982 revised and 1983 budgets respectively, plus a further 15 million ECU each for 1984, 1985 and 1986, if the project was to continue at all. He also pointed out that more delays will increase the cost of the project still further and that the cost of closing down the Essor reactor would not be cheap either.

Part of the explanation for the dramatic rise in cost estimates lies with the nature of the revision of JRC's programmes. Next year will be a special bridging year between the last programme (1980–83) and the 1984–87 programme. More staff are being recruited and 161 new posts are being created, 81 of them for the Super-Sara project, although the Commission claims that this is a temporary expansion to cope with the expected retirement of senior scientists. It now seems likely that instead of new staff being engaged there will have to be redeployment of staff among JRCs and national laboratories or certain other projects or plans will have to be curtailed such as the increase in JRC research asked for in nuclear energy. Except for the possibility of the number of experiments being reduced, there appears to be very little room for compromise over Super-Sara itself, and the British are worried about putting too many eggs in one basket. Even under present calculations, the fast breeder safety and the fuel cycle safety programmes are being cut back.

Jasper Becker

Thermonuclear fusion

Padua approved

Brussels

It is now virtually certain that the reversed field experiment (RFX) which was originally to be funded by the UK Atomic Energy Authority at the fusion research centre at Culham, will be taken on by the Italian Comitato Nazionale Delle Richerche and built at its laboratories in Padua. The consultative committee of the fusion programme was given the go-ahead to both this project and the construction of the Wendelstein VII advanced stellarator project, to be built at the Garching Laboratory of the Institut für Plasmaphysic in Germany.

Researchers were disappointed last year when the British government decided that there was no room in Culham's budget for the British contribution to the experiment of 16.5 million European currency units (ECU, 1 ECU = 55p). RFX is a direct descendant of ZETA — the zero energy thermonuclear apparatus — which hit the headlines in the late 1950s when it failed to achieve fusion for reasons which were not understood for some years. G.B. Taylor in the next decade proposed the reverse field theory to explain the failure and it was hoped that Britain could continue to lead the world in this field.

Reversed field pinch is one of the three options for achieving fusion which are being pursued in Europe under the Community's research programme. The experiment which will now be started in Padua will involve the construction of a 2,000 kA machine which will enable the experimenters to achieve a longer plasma confinement time. Padua had in 1978 been successful with a much smaller machine, known as ETA-BETA, capable of producing plasma currents up to 250 kA.

The project will still involve staff from Culham but the Italians will be providing the bulk of the cost of the experiment, some 15.7 million ECU, which will start next year and cover about four and a half years. The Community's budget will meet the rest of the cost, totalling 28.5 million ECU although this may rise, depending on whether the US Department of Energy is still willing to contribute to the cost of the project.

Officials in Brussels are, however, confident that the project may now go ahead without further setbacks. In fact, there may be advantages in siting the experiment in Padua where it will not have to play second string to the JET tokamak.

The Wendelstein VII advanced stellarator project will be the first stellarator to use modular twisted coils instead of helical windings to create the poloidal half of the magnetic field that heats and compresses the plasma. The stellarator will cost 12 million ECU to build and the Community will be contributing 5.4 million ECU.

Jasper Becker

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