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Case No: TLQ/08/0023

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 05/06/2009

Before:

MR JUSTICE FOSKETT

Between:

AB & Others
- and -
Ministry of Defence

Claimants

Defendants

Benjamin Browne QC and Catherine Foster & Mark James (instructed by **Rosenblatt Solicitors**) for the **Claimants**
Charles Gibson QC and Leigh-Ann Mulcahy QC, David Evans & Adam Heppinstall
(instructed by **Treasury Solicitors**) for the **Defendants**

Hearing dates: 21st, 22nd, 23rd, 26th, 27th, 28th, 29th January and 4th, 5th, and 6th February 2009

Judgment

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Mr Justice Foskett :

1. The Issue

1. The broad issue in this case is whether those who claim to have suffered injury, disability or death in consequence of their exposure to ionising radiation as a result of their presence near, or involvement in the aftermath of, nuclear tests carried out by the British Government in the 1950s may now pursue claims for compensation and, in respect of those who have died, whether claims by or on behalf of their dependants or their estates may now be maintained.
2. The majority of those who seek to make a claim in these proceedings, or on behalf of whom a claim is made, are former servicemen from each of the three major British services, but there are a few civilian Claimants and a number of Fijian and New

Zealand servicemen who form part of the group. Many of the British Claimants were young men undergoing National Service at the time.

3. The Ministry of Defence contends that it is now too late for any such claims to be advanced, relying upon the Limitation Act 1980 in support of the argument that any opportunity to bring a claim of this kind was in many cases lost years ago.
4. The claims are brought as part of a group action involving 1011 Claimants, ten individual test cases having been chosen by the parties for the purposes of helping to determine the limitation issues.
5. This case does not deal with the claims for compensation in their own right. Subject to the question of the extent to which it is relevant and appropriate for the Court at this stage to make an assessment of the strengths or otherwise of the claims sought to be advanced (see paragraphs 568-569 below), the merits of the individual claims do not arise for consideration. If, in due course, the ultimate outcome of the present proceedings is that the claims may continue, the full merits of the cases on each side will be determined at a future trial.
6. It is important to emphasise the matters reflected in the previous paragraph because a fair amount of the argument during the hearing, both on paper and in some of the oral submissions, involved contentions about the potential merits of each side's case. It is a matter to which it will be necessary to return, but it should be noted that a good deal that has been asserted by Counsel at this stage of the case has not been tested by reference to a full analysis of the evidence. A number of matters that may appear to have been put forward as "facts" have yet to be considered fully and properly in the way that a full trial of the issues demands. It should also be understood clearly that my task in these proceedings at this stage necessarily and inevitably involves making a number of assumptions about what may be established at a future trial. Whether those assumptions prove to have been valid or correct will depend upon a full evaluation of the evidence at trial.
7. It should also be understood that the case does not deal with claims made in respect of miscarriages undergone, and stillbirths experienced, by wives and partners of men who were involved in some way in the tests: by agreement between the parties any issues arising from matters of that nature have been put to one side whilst the issues arising in the way mentioned in paragraph 1 are dealt with.
8. The broad issue identified in paragraph 1 is easy to state. It is far less easy to resolve. There are complex and detailed issues to consider. As will become apparent, there are various categories of potential claimant and the issues concerning each category may differ. The purpose of this trial has been to decide whether, in accordance with the applicable law, any or all of those categories of claimant are now, some 50 years or so after the material events, entitled to proceed with their claims.
9. It will be necessary to refer to things done or not done, said or not said, as the case may be, by various British Governments and others over the years in relation to questions such as suggested inquiries, claims for compensation, considerations relating to pensions and so on. However, this judgment is not to be seen as a critique of, or commentary upon, those matters. Nor is it or can it be a commentary upon what other countries have done in respect of their nationals who may arguably have been

affected in a similar manner. The hearing has not been a public inquiry – nor has it been a request for one.

10. The framework for consideration of the issues arising in the case is solely the legal framework of the law of limitation as it applies to the personal injuries claims sought to be made arising from the material events. The events concerned are unique and unprecedented in British history and the issues arising from those events very different in many respects from those arising in a normal personal injuries claim. Those considerations may play a part in the analysis of the issues. However, the essential starting point is that there is no unique law that applies to this case: the law is that which Parliament and the higher courts have laid down in relation to limitation issues in all personal injuries claims.
11. This case is one in which a dry recitation of the legal issues at the outset would be an inadequate introduction to the judgment. Some attempt, itself doubtless inadequate, to put the events and the arguments in an appropriate historical context is called for. The purpose is not to make any kind of statement or judgment about that historical context or the political, moral or ethical implications of what occurred: that is not the province of the Court. The purpose is merely to try to provide some kind of canvas upon which the more detailed picture is to be painted.

2. The historical context

12. As already indicated, any attempt to set the issues arising in this case in an historical context will almost certainly be inadequate. It is a context about which historians have written extensively. An argument plainly exists for beginning earlier than the dropping of the atomic bombs over Hiroshima and Nagasaki at the end of the Second World War, but those events represent a convenient point in 20th century history at which to start for the purposes of this case.
13. On 6 August 1945 a Uranium bomb nicknamed ‘Little Boy’ was dropped from an aircraft and detonated approximately 1,900 feet above Hiroshima. The yield has been variously estimated to have been the equivalent of between 13 and 15 kilotons of TNT (trinitrotoluene). *The Times* the following day reported the announcement of President Truman that it was “more powerful than 20,000 tons of TNT”. He said that it involved “harnessing the basic power of the universe.”
14. By the time of *The Times*’ report the scale of the immediate physical and human devastation would not have been known. The article reported a lengthy statement composed by Winston Churchill, recently replaced by Clement Atlee as Prime Minister, and issued by Mr Atlee from 10, Downing Street, revealing the secret co-operation on the project over the previous four years between Britain and the US. The statement concluded with these words:

“This revelation of the secrets of nature, long mercifully withheld from man, should arouse the most solemn reflections in the mind and conscience of every human being capable of comprehension. We must indeed pray that these awful agencies will be made to conduce to peace among the nations, and that instead of wreaking measureless havoc upon the entire

globe they may become a perennial fountain of world prosperity.”

15. On the same page as that report is a report of a comment by Sir John Anderson, Lord President of the Council, who had been responsible for the research in relation to the bomb. He said this:

“The amount of energy locked up in the atomic bomb is prodigious, and the problem of controlling its release has not been solved. All the effort of the last few years has been directed towards the explosive release of energy. There are great possibilities, if energy on the scale represented in the bomb is made available to drive machinery, and provide sources of power. It might produce something that will revolutionize all industrial life, but it will take many years of research before an effective process is worked out”

16. In his book entitled ‘Second World War’ (1989), Sir Martin Gilbert, Churchill’s official biographer from 1968, said this:

“The scale and nature of the destruction of human life at Hiroshima was eventually to alter the whole nature of how mankind looked at wars, power, diplomacy and the relationships between states.”

17. In making that observation, Sir Martin Gilbert may well have had in mind also the bomb dropped over Nagasaki three days later on 9 August. A Plutonium bomb nicknamed ‘Fat Man’ was dropped from an aircraft and detonated approximately 1,650 feet above Nagasaki with a yield estimated to be the equivalent of 21 kilotons of TNT.
18. As will be known, Japan surrendered a few days later.
19. The moral, ethical, political and other wider implications of the bombings of Hiroshima and Nagasaki have over the years engaged the attention of politicians, political commentators, historians (including military historians), writers, poets, songwriters, film-makers, philosophers and many other people from all walks of life from all parts of the world. Given that the bombings were, on any view, events of enormous world significance, it is unlikely that they will ever cease to be the focus of debate. Those who lost their lives at the time and in the years that followed as a consequence of the bombs are remembered annually in the two cities on the anniversaries of the bombings.
20. Those events occurred in August 1945. The prospect of future Anglo-American co-operation over nuclear matters ended in August 1946 with the passing by the US Congress of the Atomic Energy Act (‘the McMahon Act’) which prohibited the passing of classified atomic information to any foreign country, including Great Britain. If Britain wished to develop its own atomic weapons, it would need to do so without American assistance.

21. History now shows that in January 1947 a meeting of senior Cabinet ministers in the Atlee government decided to press ahead with the development of Britain's independent nuclear weapon capability. However, the first nuclear test in the ensuing programme designed to achieve possession and control of such a capability did not take place until 1952 by which time Winston Churchill was once again Prime Minister. The decision taken in January 1947 was not disclosed to Parliament until May 1948.
22. In her book entitled 'A Very Special Relationship - British Atomic Weapon Trials in Australia' (HMSO, 1987 edition) Mrs Lorna Arnold OBE (Fellow of the Institute of Physics and Fellow of the Institute of Contemporary British History), who had joined the UK Atomic Energy Authority in January 1959 and in due course became the second official historian of the British nuclear weapons programmes, suggested this analysis of the decision:

“The 1947 decision was not made in response to an immediate military threat. It was based, rather, on an intuitive feeling that Britain must possess this climacteric weapon. It was seen as a manifestation of the scientific and technological strength on which Britain must depend. At the end of the war, it must be remembered, though there were American occupying forces in Germany and Austria, there was no formal United States commitment to defend Britain or Western Europe and no ‘nuclear umbrella’. NATO was not set up until 1949.”
23. There is no reason to doubt that analysis. Indeed it was reflected in the way that Mr Robin Auld QC, as he then was, referred to the tests when representing the UK Government at the Australian Royal Commission proceedings in 1985 (see paragraphs 392-400). He said this:

“They began over a generation away when much of the world was recovering from the horrors of the Second World War and fearful of a third and even more widespread and devastating conflict. The development of the atomic bomb, which had so dramatically brought the war with Japan to an end, was in its infancy both as a technology and political weapon. The intense debate about the morality and value of the use, or threat of use, of nuclear weapons and about the dangers of their associated radiological hazards was yet to come”
24. The fact is that the decision was made to pursue the objective of an independent nuclear weapon capability. It was an initiative taken in the context of The Cold War. The events that followed from the implementation of that decision represent the foundations upon which the issues that arise in this case are based.
25. The decision itself, of course, had its detractors, but nonetheless arrangements were made for a series of tests and, as will appear, the first test took place in October 1952. The sequence of tests that lies behind this case took place over the next six years and the individual tests are detailed below (see paragraphs 30-45 below).

26. Other countries conducted tests during this period and over subsequent years, none of which is directly relevant to the issues that fall to be determined in this case save to the extent that research into their consequences has added to the knowledge of the effects of exposure to ionising radiation. However, one worthy of note is the 'Castle Bravo' test, as it was called, carried out by the USA on 1 March 1954 at Bikini Atoll in the Marshall Islands in the Pacific Ocean. The device tested was the most powerful ever detonated by the United States with a yield of 15 megatons, something in the region of 1,200 times more powerful than the Hiroshima and Nagasaki bombs. There was significant (as I understand it, immediate) fall-out that had an impact upon certain islanders and the Japanese fishing vessel, 'The Lucky Dragon'. This created international concern about atmospheric thermonuclear testing.
27. In the comprehensive and helpful Generic Witness Statement of Mr Nicholas Crossley, the solicitor in the Treasury Solicitor's team with overall conduct of the litigation on behalf of the Defendant, Mr Crossley refers to this matter in this way:

"In August 1953, the USSR tested its first thermonuclear device. In April 1954, there was great publicity in the UK surrounding a report that in the US "Castle Bravo" test in March 1954, 264 people had been exposed to radiation and the Pacific fishing grounds had been contaminated. This created a great deal of public anxiety about radiation and atomic bomb testing and gave rise to a national debate on the nuclear issue which became known as the "fall-out debate"."
28. The interest in the issue in the UK contributed to the commissioning of the report to which reference is made in paragraphs 249-250 below.
29. As will become apparent in due course (see, for example, paragraphs 65 and 131 below), fall-out in a general sense has considerable potential relevance in this case.

3. The nuclear tests relevant to this case

30. It is necessary, in the first instance, to distinguish between atmospheric tests and those carried out underground. It is the sequence of what are termed atmospheric tests carried out by the British Government from which the issues in this case arise. It is not disputed that some of these tests (10 in number) were ground bursts or tower bursts (detonations at or a little above ground level) and, accordingly, are likely to have produced significant fall-out in the manner described later (see paragraph 134).
31. Some of the tests involved nuclear fission bombs and some thermonuclear bombs. The difference is explained in paragraphs 120-122 below.
32. The British Government carried out a total of 21 atmospheric nuclear tests in the six-year period from October 1952 to September 1958. Some of those tests are those that are directly relevant for the purposes of the individual claims in this case. Other countries known to have conducted atmospheric tests between 1945 and 1996 (when the Comprehensive Test Ban Treaty was signed) are the USA, the former Soviet Union, France and China.

33. The 21 atmospheric nuclear tests carried by the British Government, with the Code names indicated, were as follows:
- i) Operation HURRICANE (October 1952).
 - ii) Operation TOTEM 1 and 2 (October 1953) – 2 tests.
 - iii) Operation MOSAIC G1 and G2 (May and June 1956) – 2 tests.
 - iv) Operation BUFFALO (September and October 1956) – 4 tests.
 - v) Operation GRAPPLE 1, 2 and 3 (May and June 1957) – 3 tests.
 - vi) Operation ANTLER (September and October 1957) – 3 tests.
 - vii) Operation GRAPPLE X, Y and Z (November 1957 – September 1958) – 6 tests.

34. In fact, as will appear, Operation HURRICANE involved the detonation of the device in a ship about 8½ feet below the waterline, but has been classified as an atmospheric test, as indeed have those tests that were carried out as ground-based or tower-mounted detonations (see paragraph 30 above).

35. Those from the list that have some direct relevance to the claims advanced in present case are (i), (iii), (iv), (v) and (vii) about each of which I will say more in due course. Geographically, Operations HURRICANE and MOSAIC took place in the Monte Bello Islands, an uninhabited group of small islands off the North West Coast of Australia. One of the largest islands in the archipelago is Trimouille Island and one of the larger islands within a group of smaller islands is Alpha Island. Operation BUFFALO took place in the Maralinga region on the Australian mainland, a remote western area of South Australia. The tests in the Monte Bello Islands and on the Australian mainland were carried out with the agreement of the then Prime Minister of Australia, Sir Robert Menzies, who had been approached on the issue by Clement Atlee initially in September 1950. The GRAPPLE X, Y and Z series of tests took place on Christmas Island (now Kiritimati), an atoll in the Pacific Ocean many miles from Sydney in Australia and San Francisco on the North American continent.

36. The tests carried out need some further elaboration:

(i) Operation HURRICANE

This involved the detonation on 3 October 1952 of a 25 kiloton fission device exploded 8½ feet below the waterline of HMS Plym (which was destroyed in the process), anchored just off Trimouille Island. Air sampling was carried out by the Royal Australian Air Force (RAAF). The Ministry of Defence says that the purpose was to test a prototype atomic device, with a view to developing an operational atomic weapon for the Royal Air Force and to test the effects of the detonation of such a device in a location resembling a harbour so as to assess the likely consequences of an atomic explosion in a port area.

(ii) Operation TOTEM 1 and 2

Operation TOTEM 1 took place on 15 October 1953 at Emu Field (480 km north-west of Woomera in South Australia.) This was a tower-mounted device with a yield of 10 kilotons. Air sampling was carried out by the RAAF and USAF. TOTEM 2 took place at the same location on 27 October. It was also a tower-mounted device with a yield of 8 kilotons. Air sampling was carried out by the RAAF.

(iii) Operation MOSAIC G1 and G2

Operation MOSAIC 1 ('Hotshot' or 'G1') involved a detonation on 16 May 1956 of a fusion 15 kiloton tower-mounted high-yield warhead. HMS Diana was present at this test to monitor fall-out/residue. Air sampling was carried out by Canberra B6 aircraft from 76 Squadron RAF. Operation MOSAIC 2 ('Flashlight' or 'G2') involved a detonation on 19 June of a fusion 60 kiloton tower-mounted warhead on Alpha Island to the west of Trimouille Island. HMS Diana was again present at this test. Air sampling was carried out as before. The Ministry of Defence says that the purpose of Operation MOSAIC was to obtain information for the first thermonuclear test by the UK ("Operation GRAPPLE") proposed for the Christmas Island area in 1957 and 1958. More particularly, the tests were an experiment to measure whether conditions in which thermonuclear reactions occur could be generated. Both tests were nuclear and were not thermonuclear or "hydrogen" tests. However, they did contain some quantities of thermonuclear material, sometimes referred to as "light elements."

(iv) Operation BUFFALO

Operation BUFFALO 1 was carried out on 27 September 1956 at One Tree on the Maralinga Range. This tested the 'Red Beard' warhead using a 15 kiloton, 31-metre tower-mounted detonation. The Indoctrinee Force (see paragraphs 39-44 below) was present at this detonation. Air sampling was carried out by Varsity aircraft and Whirlwind helicopters. On 4 October 1956 Operation BUFFALO 2 took place at Marcoo on the Maralinga Range. This tested the 'Blue Danube' 4 kiloton warhead with a low yield (1.5 kilotons) Mark 1 enriched Uranium core. The device was placed in a shallow pit and exploded. The Indoctrinee Force was present at this detonation. Operation BUFFALO 3 took place on 11 October and was an airburst bomb dropped by the RAF over the Kite range at Maralinga. It exploded at about 500 feet above ground. The yield was approximately 3 kilotons. Operation BUFFALO 4 was a tower burst detonated at the Breakaway site on the Maralinga Range. The yield was approximately 10 kilotons. The Ministry of Defence says that Operation BUFFALO was designed primarily to advance research and development and to carry out "proof tests" of atomic weapons. The first two tests were required to test prototype service warheads. The third test was fired partly to obtain scientific data and partly to obtain data on weapon effects. It also provided the RAF with the opportunity to drop a nuclear bomb. The fourth test was the test of a service weapon.

(v) Operation GRAPPLE 1, 2 and 3

On 15 May 1957 GRAPPLE 1 ('Short Granite') took place. It involved an airburst at a height of 8,000 feet about 1½ miles off Malden Island (some 400 miles to the south of Christmas Island) following the dropping of the bomb from

a Valiant bomber. The yield was about 300 kilotons. This was a radiation implosion thermonuclear device. On 31 May GRAPPLE 2 ('Orange Herald') took place. It involved an airburst off Malden Island from a bomb dropped from a Valiant bomber. The yield was 700-800 kilotons, a record (at the time) for a pure fission bomb. On 19 June GRAPPLE 3 ('Purple Granite') took place. It was another airburst off Malden Island from a bomb dropped from a Valiant bomber. The yield was about 200 kilotons.

(vi) Operation ANTLER

On 14 September 1957 ANTLER 1 involved the explosion of a tower-mounted bomb at the Tadjji site on the Maralinga Range. It produced a yield of approximately 1 kiloton. Aerial survey was carried out by Varsity aircraft. On 25 September ANTLER 2 took place at the Biak site on Maralinga Range producing a yield of approximately 6 kilotons. Aerial survey was again carried out by Varsity aircraft. On 9 October ANTLER 3 involved a bomb suspended about 300 metres above ground from a balloon at the Taranaki site on Maralinga Range producing a yield of approximately 25 kilotons.

(vii) Operation GRAPPLE X, Y and Z

On 8 November 1957 GRAPPLE X ('Blue Danube') took place. It was an airburst planned to explode some 8,000 feet above the ocean off Christmas Island. The bomb was dropped from a Valiant bomber. The yield was 1.8 megatons (1 million tons of TNT). This was the first time a yield above 1 megaton had been achieved. On 28 April 1958 GRAPPLE Y took place. This was an airburst also planned to explode at 8,000 feet above the sea off Christmas Island. (There is an issue about whether in fact it exploded nearer to or perhaps less than 5000 feet above the sea – if so, the risks of greater fall-out impact were significantly greater.) The bomb was dropped from a Valiant Bomber. The yield was 3 megatons, the highest yield achieved in all the British tests. On 22 August GRAPPLE Z1 ('Pennant') involved a balloon suspended 24 kiloton hydrogen/fusion detonation approximately 700 km south-east of Christmas Island some 450 metres over land. Air sampling was carried out by 76 Squadron RAF Canberra B2s. The yield was estimated at 24 kilotons. On 2 September GRAPPLE Z2 ('Flagpole') involved a 1 megaton hydrogen/fusion air burst at 2,800m (9,440 feet) over the sea off Christmas Island from a bomb dropped from a 49 Squadron RAF Valiant. Air sampling was carried out by 76 Squadron RAF Canberra B6s. On 11 September GRAPPLE Z3 ('Halliard') involved a 0.8 megaton hydrogen/fusion air burst at 2,600 m (8,500 feet) over the sea off Christmas Island from a bomb dropped from a 49 Squadron RAF Valiant. Air sampling was carried out by 76 Squadron RAF Canberra B6s. On 23 September GRAPPLE Z4 ('Burgee') involved a balloon suspended 25 kiloton hydrogen/fusion detonation approximately 700 km South-East off Christmas Island some 450 m over land. Air sampling was carried out by 76 Squadron RAF Canberra B6s. The Ministry of Defence says that the primary purpose of the test was to produce a 1-ton, 1-megaton warhead that was invulnerable to radiation damage that might render it inoperable.

4. The men who went to the tests and the scale of the operations

37. Over 20,000 British men were present in the general areas of the tests identified above. That statistic of itself will give some appreciation of the scale of the undertakings involved. However, the following paragraph in Mr Crossley's Generic Witness Statement is agreed as conveying fairly the scale of the operations involved:

"The scale of the tests was huge. There were 21 detonations over 6 years or so. Well over 20,000 individuals attended the tests overall. The tests were planned as military operations and they represented the largest military undertaking since the Second World War and the entire venture was unprecedented. The development of nuclear weapons was in its infancy, and this meant that those who planned and implemented the tests were working in a wholly new area of operations, setting their own rules and standards and not simply following custom and practice or regulatory guidelines as would normally be the case. This was as true for the earlier tests as it was for the later ones, when thermonuclear devices were tested for the first time. It would not be an overstatement to say that a "Task Force" was necessary to carry out this undertaking; at GRAPPLE for example, a fleet of Royal Navy and Royal Fleet Auxiliary ships, a fleet of many different types of aircraft, (bombers, reconnaissance, rescue, transport), hundreds of thousands of tons of supplies and equipment, and of course, thousands of military and civilian personnel from several nations. Much had to be transported 7,500 miles to Christmas Island, although some supplies were sourced from Australia, (Perth in Northern Australia was about 1,500 miles away). The engineering undertaking at each of the test sites was enormous too: the preparation work alone took more than 2 years. A wharf and port had to be built together with roads, two 6,000 foot runways, recording stations, a water processing plant and accommodation, sanitation and recreational facilities for four thousand men (at the peak); and all had to be built from nothing."

38. Of the 1011 Claimants (which include the descendants of some who were present at the tests but who have since died) there are 232 British army personnel, 266 RAF personnel, 196 Royal Navy personnel, 3 British civilians, 189 Fijian servicemen, 6 Fijian civilians and 125 New Zealand servicemen. It is said by the Defendant, without challenge on behalf of the Claimants, that the overwhelming majority of the Claimants (something like 70% of attendances) were at the GRAPPLE series of tests. However, it should be noted that the word "attendances" does not necessarily reflect accurately the number of men involved: one man may have attended several tests, thus contributing to several "attendances" and there is indeed evidence that this occurred.
39. The "Operation BUFFALO" tests at Maralinga in August and September 1956 were attended by members of what is known in these proceedings as 'The Indoctrinee Force'. In fact none of the Lead Cases involves a member of the Indoctrinee Force. However, allegations are made in the Master Particulars of Claim in relation to the

alleged exposure to ionising radiation of members of the Indoctrinee Force and I assume, without having been told specifically, that decisions on the Lead Cases will assist in relation to any limitation issues that may arise in connection with members of that group.

40. Having reviewed the allegations made in the Master Particulars of Claim and the response to those allegations reflected in the Defence and Mr Crossley's Generic Witness Statement, it is plain to see that there are contentious issues on both sides of the argument relating to the Indoctrinee Force if the matter should go to trial. I propose, therefore, to say very little about the competing contentions and will do no more for present purposes than to identify the essential nature of the Indoctrinee Force.
41. The rationale for the Indoctrinee Force was that the War Office wanted to send some officer spectators to be present during the trials. This was "considered to be of the greatest importance in view of the fact that there are at present practically no British Army officers who have any conception of what an atomic explosion is like, whereas the Americans have already made use of atomic tests to indoctrinate whole formations of troops. We must at least make a start in battle indoctrination with some of our future regimental and formation commanders": see 'The Outline Army Requirements for Operation BUFFALO, 1955'.
42. The men chosen comprised largely officers destined for higher command, who were present to witness the trials and the effects on conventional Service equipment, including the effects on artillery, small arms, ammunition, demolition explosives, vehicles, field defences, textiles, rubbers, plastics, uniforms, foodstuffs and so on. For this purpose it was necessary to enter test areas after the explosion to inspect equipment test decontamination procedures and to gather data.
43. Issues are raised in the pleadings concerning the amount of protective clothing provided, the availability of respirators and the level of monitoring of the radiation to which they were exposed and/or which they absorbed. The Defendant's position, in summary, is that all these matters were fully and properly dealt with, radiological safety being of primary concern throughout the tests.
44. As I have said, it is inappropriate for me to go further into these matters, but it is important to know that this group exists to which it is possible that some individual Claimants belong.
45. In the overall context of identifying those who attended the tests it should also be noted that a significant number of scientists, doctors and senior military officers were also present and/or in the region at the time of each of the tests. Some test veterans have raised questions about whether some of those personnel were better protected from the effects of radiation than they were. This is a contentious issue and, as will be anticipated, a contrary position is taken by the Ministry of Defence. It is not a relevant issue for the purposes of the present stage of these proceedings and it is not part of my task to resolve it. For a balanced view of the position, however, it is important to acknowledge the presence at the tests of personnel such as those I have identified.

5. The commencement of these proceedings and the broad nature of the limitation issues

46. The Claim Form in this action was issued on 23 December 2004. I will say more about the background to this in due course (see paragraphs 320-321, 339-340 and 434-435).
47. In its most general sense, the law is that a claimant has 3 years from the commencement of the period specified in the Limitation Act 1980 in which to institute proceedings. If he does not do so his claim is “statute-barred”. It may then be pursued only if the Court is prepared to exercise its discretion under section 33 of the Act to disapply the time limit.
48. It follows that the starting point in a number of cases where the individual Claimant is still alive will be to determine whether, on the assumption that the cause of action had itself had accrued long before (see paragraphs 473-480), he had relevant knowledge within the Limitation Act (see section 16 of this judgment below) by 23 December 2001 (namely, 3 years before the issue of proceedings). In certain cases (eg. Mr Ayres who joined the proceedings later) different dates operate. I will refer to that matter further in relation to the cases affected.
49. Where the veteran has died, there are two potential claims that may be made: one on behalf of his estate under the Law Reform (Miscellaneous Provisions) Act 1934; the other by his dependants under the Fatal Accidents Act 1976. The Limitation Act provides slightly different regimes in respect of each about which there is no substantial disagreement between the parties.
50. In relation to a claim under the Law Reform (Miscellaneous Provisions) Act 1934, section 11(5) of the Limitation Act (see paragraph 467) provides for a personal representative’s limitation period: if the claim was not statute-barred under section 11(4) at the time of the death, the personal representative has 3 years to issue proceedings from the date of the death or from his or her date of knowledge under section 14, whichever is the later. If the claim was not statute-barred at the time of the death, but the personal representative nevertheless failed to issue proceedings in time, the discretion under section 33 may be exercised but the relevant conduct to be considered (see paragraphs 556-559 below) is that of the personal representative, not that of the deceased. However, if the deceased veteran was at the date of death out of time by virtue of section 11(4), the discretion under section 33 exists to be exercised on normal principles.
51. In relation to a claim under the Fatal Accidents Act 1976, again the Limitation Act provides for a dependant’s limitation period: if the deceased’s claim was not statute-barred under section 11(4) at the date of death, the dependant has 3 years to issue proceedings from the date of death or from his or her date of knowledge under section 14, whichever is the later. If the dependant does not issue proceedings within 3 years of the date of death, he or she must rely on the exercise of the discretion under section 33. If the veteran’s limitation period had already expired at the time of the death (in other words, more than 3 years has elapsed since his date of knowledge), the claim is *prima facie* statute-barred by section 12(1) and the dependant(s) must rely on the exercise of the discretion under section 33.

52. There is a marginal difference between the parties about the factors to be taken into account when the section 33 discretion falls to be applied in the situation where the primary limitation period had expired at the date of death and the subsequent claim was over 3 years from the date of death, but I do not think it makes any difference in relation to any of the Lead Cases.
53. If the claim (whether one of a living Claimant or one made by his successors subsequent to his death) is not statute-barred the relevant Claimant has an absolute right to pursue the proceedings unless there are other grounds for preventing those proceedings from continuing – for example, if it can be said that they are an abuse of the process of the court.
54. If the claim is *prima facie* statute-barred, then, as indicated in paragraph 47, it may be pursued only if the court exercises its discretion in favour of the relevant claimant under section 33. One factor the court may need to take into account in the exercise of that discretion is, on the basis of a very broad appraisal, the strength or otherwise of the claim sought to be advanced (see paragraphs 568-569). If, of course, the claim is plainly an abuse of the process of the court, then all aspects of the discretionary exercise under section 33 fall away.
55. I will deal with the parameters of the abuse of process argument that the Defendant has raised in due course (see section 14 of this judgment). However, it should be noted at this stage that the Defendant has not made a positive application to strike out these claims on this basis: I am asked to exercise my case management powers under CPR 3.4 (and/or CPR 24.2) to achieve this end.

6. The essential case that the Claimants seek to advance

56. The Defendant criticises the Claimants’ advisers for framing their claims in, it is said, 113 ways, all made in the broadest terms. The “general lack of focus and particularity” is also criticised. Mr Charles Gibson QC, Leading Counsel for the Defendant, has suggested that parts of the cases advanced were “a mess”. He submits that the case on causation, both general and in relation to each individual, is not pleaded with appropriate particularity and says that in none of the cases has there been served the substantiating medical reports that are required in any normal personal injury action. Mr Crossley asserts in his Generic Witness Statement that “the Claimants in the group currently have no medical evidence in support of their claims and it follows that in no single case can it be said that the Claimant has reasonable prospects of success.” It is also suggested that there has been a relatively recent fundamental change to the pleaded case, namely, from what is characterised as “a high dose conventional causation case” to what is characterised as “a low dose material increase in risk case.”
57. Mr Benjamin Browne QC, Leading Counsel for the Claimants, rejects those general and specific criticisms and I will return to each of them in due course.
58. However, irrespective of the criticisms, I think it is possible to narrow the allegations sufficiently at this stage for the purposes of identifying the essential case sought to be advanced on behalf of the Claimants generally. Each individual case will have particular features, but the gist of what is being alleged is, in my view, tolerably clear, not merely by a perusal of the pleadings, but also by reference to the medical and

scientific material put before the Court in connection with the limitation issues that arise.

59. The relevant Particulars of Negligence are set out in the Master Particulars of Claim (the 'Global Particulars of Negligence') served on 29 December 2006. (The pleadings were drafted by a different team of Counsel from the team that appeared in the proceedings before me.) Under the sub-heading of "Ill effects of radiation exposure" the following allegations of negligence are made against the Defendant "in the design, planning and execution of the Atomic Bomb testing programme generally or in total by the Defendant through its predecessors, its employees, agents and servants". It is said that it -

13.1 Knew or should have known the testing programme exposed the Claimants to ionising radiation in levels, both one-off and/or cumulative, sufficient to cause damage to health including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material;

13.2 Failed to take reasonable care for the health and safety of the Claimants who were likely to be exposed to dangerous, unnecessary and unwarranted exposure to ionising radiation including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material;

13.3 Failed appropriately to consider the health and safety of the Claimants in the design and/or execution and/or aftermath of the tests;

13.4 Failed to consider, account for or allow for the effects of multiple, combined or accumulated radiation dose exposures to the Claimants in the planning and execution and aftermath of the tests including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material

60. Under the sub-heading of "Protection from radiation exposure" the following allegations are made. It is said that it -

13.7 Allowed the Claimants to enter into the zone of radiation fall-out or radiation contamination until such time as it was ascertained that the Claimants would not be exposed to harmful levels of ionising radiation;

13.8 Failed to provide any adequate protective equipment to shield the Claimants from the damaging effects of the ionising radiation including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material;

13.9 Failed to provide any adequate protective clothing to shield the Claimants from the damaging effects of the ionising radiation including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material;

13.10 Failed to prohibit or take reasonable measures to prevent servicemen from swimming or bathing in water which they or ought to have known would be contaminated with radioactive fall-out;

13.11 Failed to prohibit or take reasonable measures to prevent servicemen from consuming seafood which they or ought to have known would be contaminated with radioactive fall-out;

13.12 Failed to take reasonable care for the health and safety of the Claimants in protecting them from dangerous, unnecessary and unwarranted exposure to ionising radiation, including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material;

13.13 Failed to protect the health and safety of the Claimants in the design and/or execution and/or aftermath of the tests including, but not limited to adequate or appropriate decontamination;

13.14 Failed to protect the health and safety of the Claimants in the design and/or execution and/or aftermath of the tests including, but not limited to appropriate or adequate consideration of weather patterns, prognostications and conditions before during and after the detonations to which the Claimants were exposed

61. The allegation that appears in 13.1 (namely, the suggestion that the Claimants were exposed “to ionising radiation in levels, both one-off and/or cumulative, sufficient to cause damage to health including both external exposure to ionising radiation as well as internal exposure through inhalation and/or ingestion of ionising radioactive particles and material”) finds further expression in paragraphs 13.2, 13.4, 13.8, 13.9 and 13.12. The mechanics by which fall-out is said to have affected servicemen are set out in paragraphs 13.10 and 13.11.
62. The short point, for present purposes, is that both external and internal exposure to radiation (the latter through the “inhalation and/or ingestion of ionising radioactive particles and material”) are alleged and there are two specific means by which “radioactive fall-out” is said to have come into contact with servicemen (by inhalation and/or ingestion) at times that are inevitably some time after the initial detonations. It is alleged in essence that inadequate steps had been taken to prevent the exposure of the Claimants to ionising radiation “sufficient to cause damage to health”. It should be noted that no precise level of exposure is pleaded.

63. There are at various subsequent points in the Master Particulars of Claim allegations of a failure to monitor for alpha and beta radiation. For example, in paragraph 40.2 the following averment is made:

“Failed to monitor appropriately, accurately or at all, the Claimants’ exposure to ionising radiation immediately following the MOSAIC explosions themselves in that they failed to monitor for the presence of alpha and/or beta radiation in the form of loose contamination adequately or at all”

64. Equally, at various points the assertion is made that the monitoring where it took place (see paragraphs 376-387) was by means of film badges which “did not measure, nor were they capable of measuring, the alpha and beta exposure and/or potential levels of inhaled or ingested radioactive particles.”
65. There can thus be little doubt that at least part of the overall case sought to be advanced is that ionising radiation (including alpha and/or beta radiation) emanating from fall-out, including fall-out that entered the body by inhalation and/or ingestion of materials affected by fall-out, (a) should have been monitored properly and/or prevented and (b) had causative potency in relation to the injuries, illnesses and disabilities relied upon.
66. The general allegation of causation of damage is put thus: that the various acts or omissions set out constituted negligence by the Defendant and that negligence “was the direct and proximate cause of the injury suffered by each individual Claimant.” Thereafter specific allegations of negligence and breach of duty were made in relation to a number of the tests identified in paragraph 36 above followed by an averment that by reason of the negligence of the Defendant as set out “the Claimants have suffered pain, injury, loss and damage.” In that sense the Master Particulars of Claim followed the traditional pattern of a normal personal injury pleading and did not go so far as to allege that the exposure to ionising radiation resulting from the alleged breaches of duty “materially increased the risk” of some or all of the conditions said to have been caused. My attention has not been drawn to any changed practice whereby, when such an approach is relied upon, it is pleaded in that way. My perception is that the established practice continues to be adopted and the issue of material increase in risk, if it arises, is dealt with in the expert evidence and the arguments based upon that evidence. At all events, the Claimants’ advisers have not sought to amend the pleading despite an invitation by the Defendant’s advisers to do so. I do not think that the Defendant’s advisers can truly have been taken by surprise by the way the causation case is advanced notwithstanding the precise words of the pleading.
67. Those averments were followed by particulars of the case in relation to the injuries and causation in the following way:

“For present purposes the Claimants allege they have suffered a variety of illnesses known to result from radiation exposure.

Many illnesses, including certain forms of cancer, are radiogenic. In simple terms the process by which ionising radiation is understood to cause illness is the destruction or derangement of the molecular integrity of human

chromosomes, strands or chains of tens of thousands of genes, by energy absorbed from ionising radiation.

The M-FISH assay is one recently refined scientific technique which assists in the evaluation of this process and establishing the radiogenicity of an illness. The M-FISH assay involves “staining” or “painting” the human chromosomes different or multiple colours. Once coloured, the chromosomes are analysed in order to determine the frequency of relocations or movements of part of one chromosome (or groups of genes) onto a completely different chromosome. In an older population the normal frequency of translocations would be in the range of 1.1% to 1.7%.

There is only one known biologically plausible source sufficient to cause elevated levels of translocations in human genetic material – exposure to ionising radiation. Thus the M-FISH is a highly reliable and specific bio indicator of genetic damage caused by exposure to ionising radiation.

The processes by which the chromosomal translocations demonstrated by the M-FISH assay cause serious human illnesses are understood, and within medical and scientific probability. As example, the movement of one piece of chromosome onto another chromosome may cause the function of a proto-oncogene – a gene which “tells” cells when to start to divide – to alter its function to that of an oncogene – a gene which “tells” cells to divide at an abnormally excessive rate. This is even more likely to occur when the proto-oncogene translocates to a site in proximity to an active gene process.

Thus, illnesses like leukaemia, an excessive and uncontrolled multiplication of immature white blood, or blast cells, occur because the mechanism controlling the level of reproduction of white cells has become deranged by chromosomal damage resulting from exposure to ionising radiation.

In much the same way adverse biological consequences and illnesses occur if a translocation results in damage to a tumour suppressor gene – a gene which “tells” cells when to stop dividing.

In due course the Claimants will supply a detailed list of each Claimant and their particular radio-sensitive illnesses.

However in order to place the Defendant on the best notice presently possible, a partial list of the illnesses which the Claimants will contend to have suffered as a result of their radiation exposure secondary to the Defendant’s tests are set out in Appendix 2.

In any event, and in addition to Appendix 2, the Claimants contend, as set out in Paragraphs 6.3 and 7 of these Particulars of Claim, the following illnesses were accepted by the Defendant as early as 1948 as being injuries known to result from over exposure to ionising radiation, including internal exposure through ingestion of radioactive particles:

Skin:

Single exposure: Redness, blistering, baldness, ulceration, scarring, cancer.

Repeated exposures: Redness, skin thickening, baldness, pigmentation, over-thickening, ulceration, cancer formation.

Eyes:

Lens opacities (cataracts), eye surface burns.

Bone:

Bones cells proper – Inflammation, cell death, sarcoma (bone cancer).

Bone Marrow cells (blood forming) – Reduction of white cells or red cells in circulation, Failure to form new blood, Cancer or malignant overgrowth of blood.

Lungs:

Lungs and Bronchi – Fibrosis of lung, cancer of bronchial cells or lung.

Genitals:

Reproductive cells – temporary or permanent sterility or reduced fertility.

Other Organs:

Thyroid, Liver and Intestine – Cell scarring, loss of function, cell death, malignant (cancer) changes.

Lymphoid tissues – Reduction of lymphoid cells in blood, overgrowth of lymph tissues in lymph glands, cancer of lymph glands.

General tissues – Premature ageing.

Atomic Bomb Injuries:

Single rapid very high over-exposure: Radiation skin burns, acute radiation vomiting and sickness, haemorrhages, anaemia, sterility, prolonged wasting and death.”

68. Reference in that part of the pleading to Appendix 2 relates to leukaemia (other than chronic lymphocytic leukaemia), multiple myeloma, lymphomas (except Hodgkin’s disease), primary liver cancer (except if cirrhosis or Hepatitis B is indicated) and cancers of the thyroid, breast, pharynx, oesophagus, stomach, small intestine, pancreas, bile ducts, gall bladder, salivary gland and urinary tract.
69. There is no doubt that in some respects the particulars of injuries are expressed in very general terms and the reference to the large number of conditions does have a “belt and braces” quality about it. However, bearing in mind that these were Master Particulars of Claim, seeking to pull together claims on behalf of over 1000 potential individual Claimants, that is hardly surprising. Whatever the rules may require, it would, in my view, have been a disproportionately expensive and time-consuming exercise to have served individual medical reports in respect of each Claimant for the purposes of determining the limitation issues that fall for consideration. Whilst it might have been appropriate to apply to the court for formal dispensation from this requirement, I should be surprised if such an application would not have been granted. At all events, it is clear from the pleading as it stands that the mechanics by which at least some of the injuries were alleged to have been caused by ionising radiation was “the destruction or derangement of the molecular integrity of human chromosomes”. In one sense, that averment goes further than a traditional pleading and spells out a mechanism of injury that ordinarily would simply be left to expert evidence. I will return to this area when dealing the suggestion that none of the Lead claims can succeed without supporting medical evidence (see paragraphs 183-187 below).
70. The reference to M-FISH is essentially a reference to the sophisticated technique of examining DNA that underlies the findings of the Rowland Report (see paragraphs 401-441 below), a report that has assumed considerable significance in the case.
71. There are more detailed allegations concerning specific tests and the way servicemen were exposed to radiation, including the alleged exposure of aircrew who were expected to fly through the radiation clouds, the exposure of those who cleaned up the aircraft, the exposure of naval men on HMS Diana which sailed through fall-out and of those generally involved in all clean-up operations. It is unnecessary to set them out fully for present purposes.
72. There are three specific allegations in the Master Particulars of Claim to which I should refer. It is alleged that -

“The tests, trials, experiments and clean-up operations ... were planned and conducted with either disregard for the physical consequences upon the Claimants, or with the stated intent of exposing the Claimants to the potentially devastating consequences of ionising radiation.

The tests relevant to this action involved atmospheric, surface and low level explosions of atomic and thermonuclear devices in remote regions of Australia, Australasia and/or the South

Pacific. While each test had its own stated purpose, type of atomic or thermonuclear device, possible range of yield and methodology, all had one common theme: the exposure of humans to potentially hazardous levels of ionising radiation.

... it was the purpose of many of the tests to examine the human limits or thresholds of the biological harm caused by ionising radiation. In short, the individual Claimants were themselves subjects of hazardous and terrible experiments....”

73. These averments form the basis of the ‘guinea pig’ allegation to which I will refer in more detail in due course. The Defendant characterises this allegation as “startling and very serious” and one which is “at the core of the case that the Defendant is now expected to meet ... 50 years after [the] events took place without the key witnesses whose conduct is so roundly criticised.” As will appear in due course, I do not consider that this does truly represent “the core of the case” that the Defendant has to meet, but it is right to observe even at this stage that the ‘guinea pig’ allegation has been made by some veterans or on their behalf for a very long time, certainly as long ago as the early 1980s when it (or that part of it referable to the tests carried out in Australia) became the subject of consideration by the Royal Commission into British Nuclear Tests in Australia (see paragraphs 392-400 below). It is right also to note that not all veterans share this view of what happened to them.
74. Returning to the way in which the alleged link between ionising radiation and the various injuries and disabilities is pleaded, attached to the Master Particulars of Claim is a report from Professor Karol Sikora, a distinguished Consultant Oncologist, dated 27 December 2006. The report sets out in relatively non-scientific language the broad mechanism by virtue of which ionising radiation can cause damage to the “genetic material at a cell’s nucleus” (i.e. DNA), the amount of “DNA disruption” being directly related “to the dose and type of radiation received.” Included amongst the effects that this can have is the “serial accumulation of mutations that can disrupt the intricate growth control processes within the cell.” One consequence is the “ability to grow out of control” leading to malignant lumps or tumours within an organ.
75. Professor Sikora lists the conditions set out in Appendix 2 (see paragraph 68 above) as being known to have a greater risk of occurring if there has been exposure to ionising radiation. He also says that the list of other injuries or conditions specified in paragraph 67 above can be caused by “excessive ionising radiation exposure”. He states that “on the balance of probability those exposed to increased doses of radiation are more likely to develop one or more of the conditions listed ... later in life.”
76. He asserted that the doses received by “those witnessing ... [the] tests ... would have exceeded any reasonable estimate of a safe dose.” (As will become plain in due course, it is not the “witnessing” of the tests that underlies most, if not all, of the claims made in these proceedings: Professor Sikora is, of course, an oncologist and at that stage would have been unaware of the agreed position of Dr Patrick Regan and Dr John Lilley (see paragraphs 86 and 129-130), the nuclear physicists who have reported on behalf of the Claimants and the Defendant respectively.)
77. The Defendant asserts that this supports what is said to be “a conventional causation case”, namely, that radiation in sufficiently high doses can cause injury and that the

case thus advanced is a “high dose radiation case”. Mr Browne’s response is that nowhere in the Master Particulars of Claim is it alleged that this is a “high dose case” and nowhere in Professor Sikora’s report does he so suggest. I think Mr Browne is entitled to say that about the way the case is pleaded. Plainly, something above ordinary background level (see paragraphs 148-149) is relied upon and, equally plainly, a level at which the various illnesses or conditions may be caused or contributed to by ionising radiation is relied upon. But no “safe level” is pleaded above which it is said that it was unsafe for there to be exposure and no precise levels of exposure are pleaded.

78. To the extent that it matters, I am inclined to think that there has, as Mr Browne has contended, been a degree of “forensic posturing” in the position taken by the Defendant in relation to these matters. I cannot believe that those who have contributed to the collective viewpoint of the Defendant did not see this issue arising and there is indeed, as Mr Browne submitted, material in the reports of Dr Lindahl, Professor Kaldor (to each of whom I will refer later as experts who have provided reports to the Defendant) and Dr Lilley that suggests that each of them did not understand the case as being presented on the basis of “high doses” of ionising radiation. At all events, whether that is a valid conclusion or not, I do not think that the Defendant is or has been exposed to any prejudice as a result of the way the cases have been advanced. That conclusion does not preclude the argument that the claims are doomed to failure on the issue of causation (see paragraphs 188-241) nor does it, in my judgment, impede the proper analysis of what constitutes a “significant injury” for the purposes of the limitation arguments (see paragraphs 485-512) which is the primary focus of the current proceedings.
79. Whilst mentioning criticisms of this kind, Mr Gibson suggested that changes made in the injuries relied upon for the purposes of being “significant” at the trial compared with those set out in the Part 18 Schedule represented “an attempt to manipulate the claims in order to improve the individual Claimant’s case on limitation”.
80. I should explain that the Part 18 Schedule to which reference is being made here is the schedule served on 14 November 2008, said to be up-to-date as at 31 October 2008. It runs to some 170-180 pages, in small font and spreadsheet form, identifying all Claimants and certain items of information including their date of birth, date of death (where relevant), their service background, the tests attended and the role of the individual within them, the illnesses/conditions relied upon and the date(s) of diagnosis. As I understand it (see paragraph 83 below), this version of this particular Part 18 schedule represented the final version of a rolling process of providing information in relation to the individual Claimants.
81. In the Defendant’s written Closing Submissions Mr Gibson’s point is repeated when it is suggested also that “it is not an overstatement ... to say that there is a strong inference that the selection and abandonment of injuries in this way appears to have been done in an attempt to maximise the chances of success on limitation.”
82. Mr Browne characterised the suggestion of manipulation as “an outrageous allegation against the professional integrity of the Claimants’ legal team”. Whilst the word “manipulate” is often better avoided, I did not understand the suggestion in quite the pejorative sense that Mr Browne and his team saw it. If it was so intended, I would reject it. I can, of course, deal with matters only on the basis of what is before me, but

the way in which the information contained in the Part 18 schedule was obtained initially and subsequently updated has been explained to me, as indeed it had been to the Treasury Solicitor in a letter dated 5 December 2008, and no exception to that explanation has been taken. The letter of 5 December 2008 was written in response to one from the Treasury Solicitor which asserted that it was “not open to the Claimants to chop and change which conditions they allege are caused by participation in the tests”, the suggestion being made that “it would appear that it has been done to manipulate the appearance of the case for the purposes of limitation.”

83. In essence, as I understand it, the information in the initial version of the Part 18 Schedule was obtained over the telephone by representatives of Messrs Rosenblatts during the spring and summer of 2007. The details of the illnesses relied upon were taken largely from people of advanced years who did not have available their medical records at the time (and neither did the solicitors’ representatives) and who were, therefore, trying to recall a medical history stretching over many years. To that extent, it is suggested on behalf of the Claimants that it was not surprising that errors were made. The Part 18 Schedule did not incorporate a Statement of Truth and was updated every 3 months as further information (in the form of information over the telephone and/or, in some cases, the medical records) became available.
84. I have already (in paragraph 69) expressed understanding for the way in which the injuries alleged have been pleaded given the 1000 or so individual Claimants whose cases lie behind the 10 placed before the Court for consideration on the limitation issues. Equally, as I shall indicate later (paragraph 246), I think it was sensible of Mr Gibson effectively to abandon certain contentions as to what constituted a “significant injury” in relation to certain individual Claimants and, so far as “constructive knowledge” is concerned, to focus on matters occurring in the early 1980s onwards rather than, as foreshadowed in Mr Crossley’s principal Generic Witness Statement, much earlier periods. All this seems to me to be nothing more than a legitimate refinement of the issues as a large group action (not without its complexities) progresses. So far as individual Claimants are concerned, that certain injuries may have been put forward at various times is, as Mr Browne accepted, there on the record and might go to the credibility of what is maintained in evidence. However, given the uncertainties in the picture that each Claimant will have had concerning exposure or non-exposure to radiation and whether certain injuries, conditions or disabilities could theoretically be caused by any such exposure, it is not surprising that their individual subjective views as to what was “significant” in that context was uncertain and probably still remains uncertain in some cases.
85. To the extent that it remains an issue, I would, for my part, reject any suggestion that the court’s processes have been abused by the manner in which the question of what constitutes a (or the) “significant injury” in any individual case has been advanced.
86. I would add that I reach a similar conclusion in relation to what was characterised in the Defendant’s Closing Submissions as the “extraordinary, abrupt abandonment for the first time in the Claimants’ oral Opening of any claim for prompt radiation injury” (see paragraph 129), the suggestion being that this occurred “apparently with one eye on” the case of *Spargo v North Essex District Health Authority* [1997] 8 Med LR 125. I will deal with the relevance of this case later (paragraph 498), but the reality in this case (certainly once Dr Regan and Dr Lilley reached the same conclusion: see paragraph 129) is that there is no basis for any claim based upon exposure to “prompt

radiation” whatever those individuals who were present at the time may have thought and have continued to believe subsequently. I do not see this as a tactical decision – it is one rooted in the evidence now available to the Claimants. Again, I find it difficult to believe that, with all the resources available to the Defendant, this situation was not foreseen.

87. These conclusions do not resolve the point taken by the Defendant in relation to the causation cases, to which I will turn later (section 14 of this judgment), but they do, in my view, defuse and put into context some of the forensic points made on the Defendant’s behalf.

7. The Defendant’s essential response to the case the Claimants seek to advance

88. Given the nature of the limitation arguments the inevitable focus in the proceedings before me is upon the case sought to be advanced on behalf of the Claimants. I cannot really do justice to the Defendant’s case in the space of a few paragraphs. However, to lend some balance to what otherwise might seem to be the picture emerging I will highlight a few matters that the Defendant will wish to advance if this case goes to trial.

89. In the first place, it will be said with vigour that no-one was sent to the tests as a “guinea pig” (see paragraphs 578-579). It will be contended that all reasonable precautions against the consequences of ionising radiation were taken in accordance with the accepted standards of the day, many of those standards being internationally recognised and promulgated.

90. It will be contended that very few men (effectively only a handful of the 20,000 or so who took part) were exposed to radiation levels above the normal background level and that any illnesses or disabilities complained of by those veterans who seek to claim in this litigation have not arisen as a result of any excessive radiation exposure. Attention will be drawn to the large number of those who attended the tests who have not suggested that they have suffered in consequence.

91. The Defendant will contend that the scientific basis for the Claimants’ case is flawed and that the medical cases in support of the various injuries and conditions complained of is insubstantial. It will be suggested that such conditions or illnesses as they may establish arose, or are as equally likely to have arisen, naturally and by processes other than exposure to ionising radiation at the time of the tests.

8. The evidence underlying the present proceedings

92. I have thus endeavoured to identify the essential issue in the present proceedings and to set those proceedings in their broad historical context. I have introduced the nuclear tests involved, the men who attended them, the essential nature of the case sought to be advanced on behalf of those who claim, the broad nature of the Defendant’s response to it and, more particularly, the nature of the limitation issues raised by the Defendant.

93. Given that the material events took place over 50 years ago, it is inevitable that the task of addressing the limitation issue before the Court will involve looking at the

history of how in a general sense the question of alleged injury to health arising from presence at the tests was raised and answered at various times over that period.

94. It will be quite impossible to deal with every aspect in the kind of detail with which they are considered in some of the papers before the Court. The bundles of documents in this case exceed 100 lever arch files, many containing up to 400 pages of documentation. Mr Crossley's principal Generic Witness Statement runs to 270 pages, with nearly 7,000 pages of exhibits. Then there are the specific cases with many pages of exhibits and medical records. The Claimants' Opening Generic Submissions ran to 134 pages, the Defendant's to 140. The Closing Submissions were in this general range also and there were detailed arguments running to very many pages concerning each individual case of the 10 Lead Cases. I make no complaints about this, although if this case goes further some considerable "pruning" of the documentary material may be in order; but it is important that anyone reading this judgment should understand the extent and depth of the documentary hinterland.
95. In preparing the judgment it has been necessary to endeavour to strike a balance between dealing fairly and fully with the issues raised and producing a reasoned decision within a reasonable timescale. Whether the appropriate balance has been achieved will be a matter for others to judge, but I should emphasise that I have focused on those aspects of the evidence and argument that were emphasised particularly during the oral submissions and upon those which, though largely confined to written form, have appeared to me to lend the greatest weight to each party's case or otherwise needed to be addressed. If matters are not referred to directly in the judgment it is because my assessment is that they are unlikely to have made a material difference to the outcome. Others may, of course, take a different view on those matters, but dealing with the case in any other way would have extended considerably the period for preparing this judgment.
96. I should also emphasise that, whilst only a relatively limited amount of the substantial documentation was referred to directly during the trial, it has been necessary in preparing the review of the relevant history contained in this judgment to consider some of the underlying documentation in greater detail than was considered necessary during the trial. This was to determine, for example, the context in which certain quotations from the documentation were made in the written and oral submissions and to check for accuracy where the position was not otherwise clear.
97. I have endeavoured to compartmentalise my review of the material events and arguments for ease of reference, but there are inevitable overlaps and I have tried to indicate by appropriate cross-referencing where it may be necessary to look for additional material in relation to the matter being considered. This, I hope, avoids unnecessary repetition.
98. Before I turn to a more detailed analysis of the issues raised in these proceedings, there are a few preliminary areas that ought to be covered, some fairly extensively. I would enumerate them as follows: (a) a general statement of those aspects of the law on breach of duty and causation that may be relevant; (b) the approach to be adopted to the individual Lead Cases; (c) the general scientific considerations that need to be understood in order to understand the issues that arise; (d) the effect that ionising radiation may have upon health.

9. Breach of duty and causation – a general observation on the law

99. It is not in issue that the Defendant owed a duty of care to those participating in the tests (although the existence of a duty of care towards the New Zealand and Fijian Claimants is not admitted). It is worth recording, if only in passing, that the nature and extent of that duty of care and the question of how it should have been discharged is to be judged by reference to the standards applicable at the time. The issue of whether, if established, a breach of duty caused or contributed to any injury or disability proved to have occurred in respect of someone who could claim to have been the victim of such a breach of duty is to be assessed by reference to up-to-date and contemporary scientific knowledge. The fact that scientific knowledge about causation of damage may have moved on since the time of the “damaging incident” may, of course, itself have a bearing on the duty and standard of care to be expected at that earlier time.
100. The standard of proof in relation to all factual issues in this kind of litigation is, of course, proof on the balance of probabilities (‘more likely than not’). When a court is satisfied on an issue of fact to that standard the relevant fact is taken as established, including the “fact” that something such as an illness or disease has been caused by something else. It is well understood that proof of factual causation (see *Clerk & Lindsell*, 19th edn., Chapter 2) to the level of scientific certainty (although there is no “generally accepted standard of scientific proof”: *per* Stuart-Smith LJ in *Loveday v Renton & another* [1990] 1 Med LR 117,124) is not required by a court (see, eg, *Temple v South Manchester HA* [2002] EWCA Civ 1406; *Shortell v Bical Construction Ltd*, 16 May 2008, Mackay J) even when, as part of its fact-finding responsibility, the court has to evaluate scientific and medical research material that does address issues on that basis. Such material often refers to the “95% confidence level” which is the level of statistical significance often used in the scientific world to exclude the possibility that when something occurs in a cohort of cases studied it does so by chance rather than by reference to the issue under investigation within that cohort. (See also *Reay v British Nuclear Fuels* [1994] 5 Med LR 1.) It is also worth recording that, whilst a court will always pay very close attention to what the scientific evidence reveals, it is required to consider the evidence as a whole in determining any issue of fact on the balance of probabilities.
101. There are some situations when proof of an issue on the balance of probabilities requires particularly cogent evidence: see paragraph 607. It is possible that in respect of the “guinea pig” issue in this case such considerations may arise.

10. The correct approach to the Lead Cases

102. Plainly, each of the Lead Cases needs to be considered separately in relation to the issue of knowledge even if there are some aspects of each that might be said to overlap with others.
103. Equally, if the exercise of the discretion under section 33 is called for it is necessary to “consider the exercise of [the] discretion separately in relation to each claim”: *Nash v Eli Lilly & Co* [1993] 1 WLR 782, *per* Purchas LJ at 808F-810E. There may, of course, be factors of a generic nature that impact in each individual case.

104. In the context of considerations of this kind Mr Gibson urged me to consider what the response of the court would be if an individual Claimant came to the court and made some of the “across the board” submissions made by Mr Browne. He submitted that “many of the difficulties and complications that ... arise if one looks at the matter in such a generic way fall away” if the cases are looked at on their individual merits. It is a legitimate argument to advance, but, in my view, this is one case where, as I have already indicated, there are some “across the board” and generic matters that cannot be ignored. This is largely a function of the unique circumstances giving rise to the issues to which I have already adverted (paragraph 10) and to which I will return (see paragraph 582).

11. The underlying science

105. There are two areas of science about which it is necessary to have some broad understanding to enable an appreciation of the issues that arise in this case even at the stage of the preliminary arguments as to limitation. They are the *essential nuclear physics* and the *essential cytogenetics*.

106. The brief analyses of ionising radiation and chromosomal instability that follow represent distillations of scientific material appearing in the papers before the Court. I should emphasise that, because the matters come before me on a “preliminary issue” basis, I have not had the advantage of hearing any oral evidence from expert witnesses nor, of course, have the expert witnesses who have prepared reports met and discussed matters in the way that would have occurred had this been a trial of the substantive cases. If they had done so, doubtless there would have been a substantial measure of agreement on some of the fundamental matters. Because no such process has occurred that which follows commands considerably less authority than might otherwise have been the case. However, despite that “health warning”, I trust that the analysis is sufficiently accurate for the purposes for which it is required.

A. The essential nuclear physics – ionising radiation

107. Ionising radiation underlies almost everything in this case. The effect that it may have upon humans exposed to it is a matter to which I will turn later (see paragraphs 159-182).

(i) atoms

108. All matter is ultimately composed of atoms. An atom is itself made up of various sub-atomic particles which, for this purpose, can be confined to neutrons, protons and electrons. As its name suggests, a neutron is electrically neutral. A proton is positively charged. An electron is negatively charged.

109. An atom consists of a nucleus, which itself consists of neutrons and protons, surrounded by a cloud of electrons. Because there are protons within the nucleus, the nucleus itself is positively charged. However, the number of protons in a nucleus is generally matched by the same number of electrons, resulting in the atom as a whole being electrically neutral.

110. Within the minuscule scales that constitute the means by which the dimensions of atoms and sub-atomic particles are measured, protons and neutrons are, relatively

speaking, very considerably greater in mass than electrons and very considerably bigger.

(ii) elements

111. Save where elements exist in isolation (e.g. oxygen), all matter is ultimately composed of a combination of the various elements that have been identified as existing naturally on Earth. A total of 92 elements existing naturally on Earth have been identified. They are frequently represented in the tabular form that is known as The Periodic Table. The table starts with the lightest and smallest of all atoms, the hydrogen atom, and moves through to the heaviest and largest of the naturally occurring atoms, that of Uranium. (Other elements are known and have been discovered, but they tend to be products of nuclear reactions, either on Earth or as part of the processes by which the matter constituting the Universe came to be formed.)
112. An element is defined by the number of protons in its nucleus. The number of protons in the nucleus of an atom is given the symbol 'Z' and this represents the "atomic number" of the element. Carbon, for example, has six protons in its nucleus and its atomic number is, accordingly, six.
113. The number of neutrons in the nucleus of an atom (given the symbol 'N') assists in defining the mass of the atom (the "atomic mass" known as 'A'). The sum of the number of protons and neutrons ($Z + N$) in an atomic nucleus constitutes the atomic mass of the atom.

(iii) isotopes – radioactive and otherwise

114. In some (indeed most) elements, the number of neutrons in the nucleus may vary. For example, carbon, which usually has six protons and six neutrons in the nucleus, may sometimes have seven or eight neutrons. Each kind of atom of this nature is called an isotope of the element in question. Taking carbon as an example, by far the greatest amount of naturally occurring carbon on Earth is Carbon-12 (in which the nucleus consists of six protons and six neutrons). There is a small amount of Carbon-13 and trace (i.e. tiny) amounts of Carbon-14, the atoms of each containing seven and eight neutrons respectively. Most people will have heard of Carbon-14 (used for the purposes of radiocarbon dating). It is a useful illustration of what makes an isotope "radioactive" because Carbon-14 is, in ordinary parlance, mildly radioactive. What is it that makes one isotope of carbon radioactive and yet the others not?
115. Essentially, there are certain combinations of neutrons and protons that are stable and others that are not. Those that are unstable undergo what is known as "radioactive decay". In traditional terminology, those which are unstable will "decay" into a more stable "daughter" product. This process of decay (known as radioactivity) involves the emission or release of energy in the form of ionising radiation comprising particles (principally, alpha and beta particles) and electromagnetic radiation (principally, gamma rays).

(iv) half-life

116. The rate at which unstable nuclei decay is measured by reference to the *half-life* of the radioactive isotope in question. In simple terms this is the time taken for half of the

nuclei present in any sample of radioactive material to decay. In other words, after the elapse of a half-life 50% of the original radioactive material will remain radioactive and after two half-lives 25% of the original radioactive material will remain radioactive and so on.

117. The decay process involved does not necessarily mean that the “daughter” or “granddaughter” product is itself non-radioactive. The process may result in the production of further radioactive isotopes, each with its own half-life.
118. Half-lives can vary from a few microseconds to thousands or billions of years. Carbon-14, for example, has a half-life of 5,730 years. It does follow that any radioactive isotope with a reasonably long half-life will continue to emit ionising radiation. It is this feature that underlies the case made on behalf of the veterans in relation to fall-out (see, for example, paragraph 142).
119. I will return to the significance of the various types of ionising radiation in paragraphs 123-131 below. However, this a convenient point to note the different ways in which nuclear power has been utilised to produce bombs. Again, it may have some relevance to the issue of fall-out to which I will return later.

(v) nuclear fission and nuclear fusion

120. There are two processes that need to be understood: nuclear fission and nuclear fusion. *Nuclear fission* occurs when a heavy nucleus of the fissile material splits into two smaller nuclei with the emission of a number of free neutrons. This is not something that ordinarily takes place spontaneously. What is usually required is the bombardment of the nuclei of the fissile material by free neutrons. The nucleus of the fissile material “captures” a neutron which renders the nucleus unstable causing it to split. The best known example is the bombardment of Uranium-235 (i.e. Uranium with an atomic mass of 235) with neutrons with the result that it is converted (by neutron capture) into Uranium-236 which then splits spontaneously into two smaller nuclei and the emission of free neutrons. Those free neutrons then go on to cause further fissions by the same process thus generating the well-known nuclear “chain reaction”. The whole process is associated with the release of significant energy. *Nuclear fusion*, as its name suggests, involves the process whereby two or more light nuclei combine together to form a heavier nucleus with associated energy release. Fusion is the process that occurs naturally in stars. Light nuclei will fuse only when exposed to significant temperatures (in excess of 10 million degrees centigrade). Temperatures of this level can be generated during a nuclear fission explosion.
121. A nuclear weapon based solely on nuclear fission is often called an “atomic bomb”. A bomb based on nuclear fusion is called a “thermonuclear bomb”. In a thermonuclear bomb, a fission bomb acts as the trigger for generating nuclear fusion in the fusion fuel. In the earlier thermonuclear bombs, liquefied hydrogen was used as the fusion fuel, thus generating the name “hydrogen bomb”.
122. In order to understand one particular feature of fall-out (the paragraph 135 below), it is necessary to have a rudimentary knowledge of the construction of a fission bomb. The usual construction of what is called an “implosion” bomb involves a series of concentric spherical shells, the inner one consisting of fissile material such as Uranium-235 or Plutonium-239 or a combination of both. This is surrounded by what

is called a “tamper shell” constructed of very dense material which is usually depleted or natural Uranium. The outer shell consists of a chemical high explosive. When that explosive material is detonated it drives the tamper material inwards, compressing the fissile material into a super-critical mass and triggering the nuclear explosion. It will be appreciated that residual tamper material could contribute to the fall-out.

(vi) The types and general effects of ionising radiation

123. As indicated in paragraph 115, there are essentially three types of ionising radiation that are relevant for the purposes of the issues in this case – alpha, beta and gamma radiation. Whilst that which is recorded below about these three types of ionising radiation is largely deduced from the expert reports in the material before me, each form of radiation was well-known scientifically long before the nuclear tests in question. The existence of each was discovered at or around the end of the 19th century and much was known about each by the middle of the 20th century.
124. If the claims in this case are permitted to proceed, it is likely that there will be significant focus on the effects that alpha and beta particles have or may have, upon DNA (see paragraphs 151-158 and section 14 of this judgment below).
125. *Alpha particles* are the nuclei of helium atoms, comprising two protons and two neutrons. In the scale of sub-atomic particles, they are large. Although they are high energy particles that move swiftly, they do not penetrate human soft tissues significantly. (Alpha particles are known as High-LET particles, LET standing for ‘linear energy transfer’ which is the rate at which energy is transferred from ionising radiation to soft tissue.) The danger of alpha particles, however, lies in their emission from radioactive materials within the body from sources that may have been ingested or inhaled. The International Commission on Radiological Protection (ICRP) has ascribed a radiation weighting factor of 20 to alpha particles compared with 1 for gamma rays and beta particles. The radiation weighting factor is a measure of the potential biological effects of radiation on humans.
126. *Beta particles* are fast moving electrons (called β - particles) caused when a neutron inside a nucleus changes spontaneously into a proton and an electron. It is, incidentally, the process by which Carbon-14 decays into Nitrogen-14. The energy released when a β - particle is emitted depends on the specific parent nucleus. The power with which such a particle may penetrate soft tissues varies, but it will be recalled that electrons are very small. Generally, beta particles will penetrate only a few millimetres of soft tissue. However, as with alpha particles, their danger lies in their emission from radioactive materials that may have been inhaled or ingested.
127. *Gamma rays* are sources of electromagnetic energy emitted from a nucleus as part of the decay process that enables it to reach the lowest energy configuration. Gamma rays are similar to X-rays, though with greater energy and powers of penetration, the actual amount of energy depending on the nucleus from which they are emitted. Gamma rays can penetrate and permeate the whole of the human body and will interact with the tissues.
128. It is, perhaps, of some significance to note the distances that each form of ionising radiation may travel. There is no absolute figure for any of them (because within each category the energy of the radiation may vary), but in a broad sense alpha particles

rarely travel further than about 5 centimetres in air, beta particles about 1 metre and gamma rays about 200 metres.

129. Those distances do not, however, give a clear indication of how far away from any particular nuclear test explosion it is necessary for someone to be to avoid radiation contamination direct from the immediate consequences of the blast (known as ‘prompt radiation’). Of the various forms of nuclear radiation, gamma rays form a substantial part of the initial nuclear processes following the blast. These gamma rays are emitted within microseconds of the blast and up to 99% are attenuated (i.e. weakened) within the nuclear reactions. However, there are secondary processes that yield further gamma ray radiation (called ‘delayed gamma rays’) that has the capacity to travel considerably greater distances, particularly if the explosion takes place near to the surface of ground or water. Since gamma rays travel further in these circumstances, there could be a range within which some exposure to gamma rays might occur depending on where observers are. However, at least on the calculations performed so far by the nuclear physicists on each side in the current proceedings, Dr John Lilley for the Defendant and Dr Patrick Regan for the Claimants, it is agreed that all ground-based veterans are likely to have been too far away from any of the test blasts for there to have been any or any significant gamma ray exposure arising directly from the blast. (The position may, of course, have been different for those in the “sniffer” aircraft that flew through the radioactive clouds and for members of the BUFFALO Indoctrinee Force.)
130. It follows, therefore, that whatever they may have thought at some stage in their consideration of their illnesses since witnessing the detonations (see paragraphs 76, 460, 729 and 820) – and, indeed, whatever people may think having seen photographs of men watching the mushroom clouds from a distance - unless the present position of the experts changes or the evidence relating to the distances involved alters before this case proceeds to trial if it does, the conclusion is likely to be that ground-based veterans are unlikely to have suffered any health effects from direct exposure to gamma rays immediately following the initial blast and they would have been out of any possible range of alpha and beta particles. Mr Browne made clear in his opening that it is no part of his case on behalf of the Claimants for the purposes of the present issue that radiation exposure at the time of any of the initial blasts can be demonstrated.
131. The case sought to be advanced in respect of the exposure of ground-based veterans (including to a large extent those who served on HMS Diana) to ionising radiation focuses largely on the role that fall-out (sometimes called ‘loose contamination’) may have played in creating internal exposure (i.e. exposure from radioactive materials inhaled or ingested within the body). Against that background, I must endeavour to give some description of fall-out.

(vii) fall-out

132. As will be apparent from the descriptions given above of the essential nuclear physics and of the types of ionising radiation caused by a bomb (whether fission or fusion), the products of a detonation will include very substantial quantities of radioactive material. I will say a little more about the likely constituent elements of fall-out in paragraphs 135 and 142 below.

133. A nuclear bomb produces the well-known mushroom cloud. The cloud forms because of the fireball effect caused by the release of energy in the initial explosion. The fireball expands and rises into the atmosphere and as it does so cooler air is drawn into it and upward causing the “stalk” or “stem” of the mushroom to appear.
134. When the detonation is a surface, tower-mounted or near-water blast, significant amounts of earth or seawater are swept up into the “stem” and carried upward. Indeed a burst above ground can have the same effect, though it will depend upon the yield of the bomb and the height at which the detonation takes place.
135. In this situation, the products swept up inside the cloud are affected by the radioactive processes going on within it and the two combine to produce what is known as fall-out. In addition to the fission products (see paragraph 122 above) and those created by the neutron bombardment of other atoms (see paragraph 120 above), the fall-out can consist of other radioactive materials including un-reacted bomb residues, including a contribution from the ‘tamper material’ (see paragraph 122 above). Dr Lilley’s estimate is that only about 10% of the fissile material fissions before the amount of energy released is sufficient to reduce the density of the fissile material to a sub-critical state and the nuclear reaction stops. The logic of this, according to Dr Regan, is that 90% of the initial Uranium and Plutonium would make up a significant proportion of the ensuing fall-out. (I might observe in passing that there is in the material before the Court evidence in the form of a report on “Fission Product Sampling” that the fall-out from the TOTEM tests at Emu Field was “extremely rich in Plutonium”.)
136. In the broadest sense, once fall-out is created, it disperses. Some will go into the upper atmosphere and will disperse generally around the globe. Other quantities of fall-out will fall back to Earth, either conveyed by rain or simply by heavier pieces of material falling to the ground. Where it falls will depend on a large number of factors including the weight of the particles to which any radioactive material is attached, whether there is rain and the general meteorological conditions including wind speed and direction at various altitudes.
137. There are two types of fall-out: (i) early or “local” fall-out and (ii) delayed or “long-range” fall-out. The former returns to the surface of the Earth within 24 hours of the blast and the latter over a considerably longer period of time, much remaining suspended in the atmosphere for very significant periods of time. The latter is not considered to cause an immediate health hazard, though the former can produce larger doses of ionising radiation in the general geographical location of the detonation.
138. If any of these cases go to trial in due course, as will be apparent already, it is likely that evidence will be directed to the likelihood of exposure of veterans, direct or indirect, to fall-out or its effects.
139. I should record (without, of course, drawing any conclusions about them) the positions of Dr Lilley and Dr Regan on the significance of observers being upwind of the point of detonation after the explosion. Dr Lilley has said that they would not “have received a measurable dose from exposure to fall-out if they remained upwind of the point of detonation after the explosions.” He said this in relation to GRAPPLE 1-3, ANTLER 2 and 3 and GRAPPLE X and Y. Dr Regan challenges the conclusions

in relation to GRAPPLE 1-3 and ANTLER 2 and 3. In respect of GRAPPLE X, Y and Z he has said this:

“While it is likely that assuming no rainout and completely constant wind conditions, limited fall-out radiation would have fallen upwind of the point of the detonation after the explosion, this scenario would be dramatically altered if: (a) there was any precipitation/rainout of radiation shortly after the explosion; (b) if the explosion fireball came into contact with the water surface; and/or (c) if there was a variation in wind direction following the explosion, at for example different altitudes. Any of the sum of these three scenarios will give rise to significant, measurable fall-out radiation being deposited at the Christmas Island sites, which were all within 50 miles of the detonation points for the GRAPPLE X, Y and Z explosions.”

140. Dr Regan’s reference to ‘rainout’ is a reference to rain clouds being formed by or around the particles from the nuclear explosion. The condensation when the air cools causes rain which, of course, may itself carry and be affected by radioactive materials. (See also paragraph 622).
141. So far as the constituent elements of fall-out are concerned, this is a complex matter and I will not attempt to replicate the views of Dr Regan, who has contributed a very detailed opinion on the issue, other than to try to distil the essence of what may arguably be relevant if any of the cases raising the issue goes to trial.
142. At its most simple, what is suggested is that within the radioactive material created in, or released as part of, the detonation of a bomb are materials with long half-lives (see paragraphs 116-119 above). This means that the material remains radioactive for many years and will, as part of the process of decay (see paragraph 114 above) emit alpha and/or beta and/or gamma radiation. It is accepted (see paragraphs 125-126) that alpha and beta particles arising from ingested or inhaled material can be very dangerous because of their effect upon internal organs. Of the products that may form part of fall-out that can result, over time, in the emission of alpha particles are, in particular, certain Uranium and Plutonium isotopes (some of which may derive from unexploded material as indicated in paragraph 135 above) and Polonium-210. (It will be alleged that Plutonium was one of the fissile materials used in many, if not all, of the bombs.) Beta radiation emitters include Strontium-90 and Caesium-137, each of which also emits gamma rays. Gamma rays are emitted by, for example, a radioactive isotope of Sodium created by the take-up of seawater and soil if that should occur as part of an explosion.
143. I will return to the potential ill-effects of exposure to these forms of radiation through fall-out in due course (see section 12 of this judgment).

(viii) doses

144. Various terms have been used over the years in connection with the measurement of the strength and effect of ionising radiation. A unit established many years ago, and named after the man who discovered X-rays, is the ‘roentgen’. Its precise definition

is irrelevant for the purposes of this case, but in the most general terms it was a measure of the power of radiation. The roentgen equivalent in man ('rem') became a unit of absorbed radiation dose to reflect the amount of ionising radiation with the same biological effectiveness that one 'rad' of X-ray radiation had. (The 'rad' was the equivalent measure of absorbed dose for X-rays.) A 'gray' (Gy) is a measure of the deposited energy of radiation.

145. The 'rem' became obsolete and the measure for the effective dose of radiation used now is the 'sievert'. One sievert is equivalent to 100 rem. Most measures are given in millisieverts. A millisievert (mSv) is 1000th of a sievert (Sv).
146. Mr Crossley helpfully recorded in his principal Generic Witness Statement the following:

“1 gray (Gy) = 100 rads (R) = 100 rems (r) = 1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microSieverts (microSv). 1 microSievert is 10⁻³ mSv. [According to Dr Lindahl,] 1 rad can be said to be equivalent to 6.7 mSv. However, the accepted conversion factors are that 10 mSv corresponds to 1 rad/roentgen/rep and that 10 mSv corresponds to 1 rem.”

147. In order to put into context what a millisievert means, the generally accepted view is that each human receives an effective dose of about 2.4 mSv of ionising radiation per year from natural background radiation (see paragraphs 148-149 below), increased levels being experienced by aircrew or those subject to radiation for medical purposes. The dose reconstructions following the Rowland Report (see paragraphs 401-441) revealed generally considerably higher doses than that (see paragraph 425), although these reconstructions are contentious.

(ix) ionising radiation from other sources

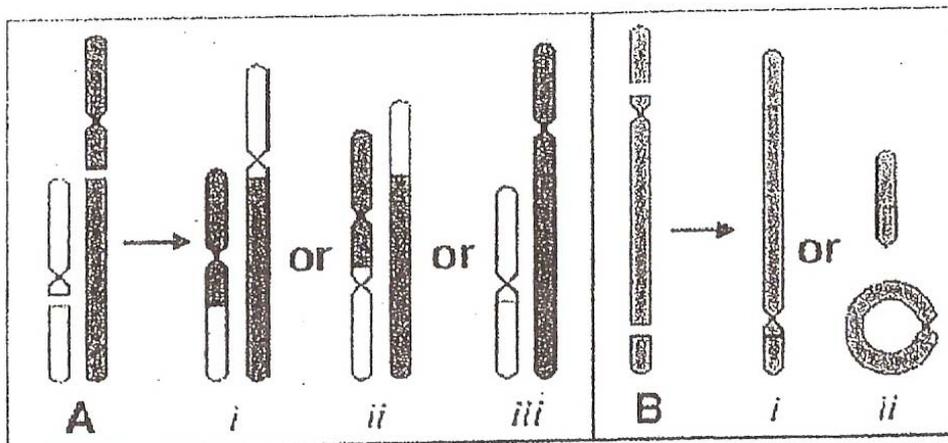
148. All humans are exposed to small amounts of ionising radiation from a variety of sources. The principal source is cosmic radiation from beyond the Solar System. Further sources in the natural environment are radon gas (which is a product of Uranium), which seeps out of the earth and certain stone buildings (particularly granite buildings), and the products of nuclear fuels.
149. As indicated above (see paragraph 147), the annual exposure arising from such background radiation is usually thought to be in the region of 2.4 mSv although it varies somewhat in different parts of the world.
150. That completes the review of the essential nuclear science that underlies the issues in this case. I need to turn now to the essential cytogenetics.

B. Essential cytogenetics

151. The essential mechanism by which it will be contended that the health problems encountered by the veterans (including, of course, various cancers) have arisen through their alleged exposure to ionising radiation is the effect that such radiation will have had upon the chromosomal structure of cells within their body and, at least

in some respects, upon cell division. This is reflected in the Master Particulars of Claim (see paragraph 67 above) and is developed further below (see section 12 below).

152. Cytogenetics is that branch of genetics that studies chromosomes and cell division.
153. Cell division is the process by which a cell (the parent cell) divides into two or more cells (the daughter cells). It is the process by which cells within the human body are replicated to maintain essential bodily integrity. The continuing process is called the “human cell cycle”.
154. Within each human cell nucleus is a DNA content arranged as a chromosome. A chromosome consists of two chromatids connected by a centromere. It is well-recognised that chromosomal aberrations (or mutations) can occur following exposure to ionising radiation (see section 12 below). Ionising radiation can cause breaks within the chromosome. The normal natural repair mechanism usually results in a complete repair of the break, but occasionally it does not work properly and a translocation of chromosome material may occur. This means that the end portions of two broken chromosomes exchange and each becomes attached to the “wrong” chromosome.
155. An illustration of the process of translocation, and its various forms, was provided in Figure 1 of Dr Darroudi’s report of 14 November 2008 which is reproduced below.



The explanation for the two compartments in this diagram is as follows:

- A. This demonstrates the occurrence of two breaks in two different chromosomes. There are three possibilities after this occurs each of which is illustrated: (i) misrepair leading to one complete translocation; (ii) misrepair leading to one *dicentric* plus one *acentric* fragment; (iii) a complete repair.
- B. This demonstrates the occurrence of two breaks in two different arms of one chromosome. There are two possibilities after this occurs: (i) complete repair; (ii) a misrepair between broken ends leading to one ring plus one *acentric* fragment.

156. As will be apparent from the diagram, a dicentric chromosome is formed when two chromosome segments, each with a centromere, fuse with each other. An acentric chromosome is formed when two chromosome fragments neither of which has a centromere combine. A centric ring is formed by the exchange between two breaks on separate arms of the same chromosome. Dicentrics and centric rings are considered unstable translocations.
157. The importance of understanding this general process in the context of the present proceedings is that it was the discovery of a significantly higher rate of translocations in the blood lymphocytes of 49 New Zealand veterans compared with a control of non-veterans that, it is claimed, leads to the conclusion that the veterans who were in the general vicinity and fall-out area of some of the tests were exposed to ionising radiation. This was the conclusion of the Rowland Report which is analysed later (see paragraphs 401-441 below).
158. It is important also to note even at this stage (as is emphasised later: paragraph 423) that the translocations observed in the New Zealand veterans were in blood lymphocytes, not stem cells, and, accordingly, do not of themselves connote or constitute the mechanism for any injury to health that may have occurred. What is claimed, however, is that the translocations thus identified evidence (or, as it is put, constitute a “biomarker” for) earlier exposure to ionising radiation which, by inference, is said probably to have caused the relevant disease or other injury to health. I will return to this at paragraphs 169 and 423.

12. The effects on health of ionising radiation

159. It has long been known that ionising radiation can have deleterious effects upon health. Inevitably, there has been a progression of knowledge and understanding over the years, but it is not in issue (and indeed it is the case for the Claimants) that knowledge of the harmful effects of ionising radiation pre-dated significantly the series of nuclear tests with which this case is concerned.
160. For the purposes of the limitation issues, the position taken by the Defendant is that given “the scientific consensus about radiation-induced injury, it is reasonable to state that any Claimant who sought expert advice would have been told that there was a link between radiation and illness/certain cancerous/genetic effects at sufficiently high doses”: paragraph 217 of Mr Crossley’s main witness statement. The consensus he refers to there is one which, I apprehend, he suggests goes back at least until the 1950s.
161. The broad issue highlighted by the position taken by the Defendant that may be relevant, both to the question of “knowledge” and to the operation of the discretion under section 33 if it arises, is the extent to which scientific knowledge about the general effect that ionising radiation can have upon health has become so much more refined with the passage of time such that reference to a “link between radiation and illness/certain cancerous/genetic effects at sufficiently high doses” is not itself a sufficiently refined analysis. Whilst again, if any of the cases proceed to trial, the issue of the mechanism of radiation-induced injury will doubtless be a focus of attention, the purpose of my brief review of the developments as I perceive them is to reflect on the broader issue thus identified.

162. Although chromosome aberrations were first suggested as possible causal factors in the origin of cancer in 1914 (see paragraph 168 below), for present purposes and in the more general sense I need go no further back than 1947. In a paper presented to the 'Committee on the Medical and Biological Applications of Nuclear Physics' entitled 'Genetic Effects of Irradiation with reference to Man', D.G. Catcheside (an eminent geneticist later to become Professor Catcheside, FRS) said that all organisms (e.g. viruses, bacteria, fungi and others) investigated following exposure to ionising radiation and ultraviolet light "show genetic effects". He also said this:

"It is therefore most probable that induced genetic changes, mutation and chromosome changes alike, will be induced in man. Most genetic changes, spontaneous and induced, are more or less deleterious."

He also said this:

"All quantitative experiments show that even the smallest doses of radiation produce a genetic effect, there being no threshold dose below which no genetic effect is induced."

163. The following year E. F. Edson, who was the Principal Medical Officer at the Ministry of Supply, presented a paper to the Society of Engineering Industry part of which was entitled 'The hazards from radiations and radioactive substances'. He drew a distinction between long-wave electromagnetic radiation (e.g. ultraviolet, infra red and radio waves) and ionising radiation and said of the latter the following:

"The second group comprises the ionising radiations, and is formed by the remaining electromagnetic waves of short wave length (X- and gamma-rays) and atomic particulate emissions including neutron and beta- and alpha-particles. These ionising radiations are capable of causing not only excitation of molecules near or through which they may pass, and some heat or occasionally fluorescence production, but most characteristically, ionisation of many of those molecules. It is ionisation of the molecules of living tissues which renders these radiations dangerous to health, because of the changes which follow ionisation in the biochemistry, the function and finally the form of the living cell. The living cells thus affected may show paralysis; partial, complete or open-recoveries; erratic and malignant cell-multiplications; chromosome aberrations; or rapid cell death. The dosage largely dictates the effect, coupled with dosage-rate."

164. The paper goes on to describe the types of ionising radiation referred to in paragraphs 123-127 above and to the particular danger that alpha particles give rise. Mr Edson says this:

"If [alpha particles] are liberated from radioactive substances deposited within the body, so that their range includes radiosensitive cell nuclei, their high relative biological efficiency can cause its full order of cell damage. If deposited

on bronchial surface, in bone, liver, thyroid gland, or in the layers of the skin, alpha-emitting substances are therefore much to be respected; although on intact and normal skin they are harmless.

The ranges of alpha- and beta-particles in air are relatively short by comparison with X-, gamma- and neutron-radiation, and they are stopped or largely stopped by quite thin barriers of inert material. Whereas gamma-rays and neutrons can form a radiation hazard at considerable distances from their source, alpha- and beta-particles can only form a hazard inside the body, or, in a case of beta-particles, within a few millimetres of the skin surface.

Any medium which will transport alpha- or beta-emitters from outside to inside the body is therefore a danger; hence the great significance of inhaled radioactive dusts or aerosols, solutions of radioactive elements able to be absorbed through skin or intestinal tract wall, transmission of radioactive materials from fingers or chemical apparatus to the mouth, and radioactive substances contaminating skin injuries. In practice, most of the occupational hazards from the short-range particles lie in the possibility of their being absorbed within the body via the lungs, mouth, intestinal tract, broken or intact skin, or even the eyes.”

Mr Edson goes on to identify the substances which are most likely to cause damage in the way indicated because of their characteristics. He identifies them as “Radium, Plutonium, Strontium, Cobalt and a very great many other elements and isotopes resulting from neutron bombardment and fission processes....” He added this:

“A radioactive element inside the body is usually at its most dangerous when it remains fixed in one position, thus causing continued radiation to the same adjacent cells and consequent cumulatively high dosages.”

The paper goes on to identify various injuries known to have arisen from over-exposure to uncontrolled ionising radiation in man and lists skin conditions (e.g. redness, blistering, ulceration and scarring); eye conditions (cataracts, eye surface burns), bone cancer, blood cancer, lung cancer and fibrosis, temporary or permanent sterility or reduced fertility, thyroid cancer, liver cancer, intestinal cancer, cancer of the lymph glands and premature ageing.

165. I have cited that paper at some length because it gives an indication of what was known at the time. In fact, although the paper was apparently presented publicly, it was not, as I understand it, declassified until 1985, some 37 years later. At all events, what that paper demonstrates is that even at that time it was certainly appreciated in scientific circles that there was a link between exposure to ionising radiation and “chromosome aberrations”. In the 1956 report to which I refer in paragraphs 249-250 below, Chapter IV of the report, entitled ‘The Genetic Effects of Radiation’, contains a detailed analysis of what was known at that time. It is, however, pertinent to note

that in the introductory paragraph to this chapter the Committee (consisting of some of the most distinguished scientific names from that generation) said this:

“Nowhere in our report have we been more conscious of the difficulties of the task which we have undertaken, and of the limitations of the knowledge at our disposal, than in considering the genetic effects of radiation. The established scientific evidence in this field provides but an insecure basis on which to frame answers to the many important questions that are now being asked. Consequently we have been forced to make many assumptions of questionable validity and our conclusions must be regarded as provisional and treated with a measure of reserve. An essential part of future studies will be the collection of more detailed vital statistics. Moreover, it must be realised that genetic studies inevitably tend to be slow and that sufficient knowledge on which to base firm conclusions will be accumulated only after many years of intensified fundamental research”

When turning to the basic principles involved, the Committee said this:

“There is as yet little direct information about the genetic effects of ionising radiations on man and, for reasons which we examine later, the few observations that have so far been made present many difficulties of interpretation.”

166. The Committee, however, did speak of “chromosome structural change” (in apparent contradistinction to “mutation”) and described how broken chromosomes would either fail to reunite or would reunite in ways that could not thereafter pass through the process of cell division. In either of those situations, it was said that the cell would normally die. A description is given of the situation in which a chromosome breakage results in the reuniting of the fragments in new patterns that are capable of passing through normal cell division.
167. Without the benefit of having heard expert evidence, it is difficult for me to be certain whether the Committee was there speaking of translocations in the way that they are presently understood. If that is what is being spoken of, there does not appear to be any direct connection made between the process of translocation and the development of any known illness or injury. Indeed it is said that “major structural changes of the chromosomes do not as a rule bring about other kinds of abnormality [i.e. other than partial sterility or abortion in their carriers] in individuals bearing them.” There was, of course, by this time evidence of the effects of exposure to ionising radiation upon those who had survived the Hiroshima and Nagasaki bombs (suggesting an increase in a number of conditions, including leukaemia and cataract), but any precise mechanism relating to chromosome aberrations does not seem to have been postulated.
168. In response to a question I raised during the trial Professor Brenner has provided an answer indicating that, whilst chromosome aberrations had, as I have already indicated, been suggested as a causal factor in the origin of cancer as early as 1914 (by the German biologist, Theodor Boveri), there were no techniques of imaging

chromosomes at that time and such techniques were not developed until much later. He continued as follows:

“The first description of a specific cancer-associated chromosome aberration was the so called Philadelphia chromosome in chronic myeloid leukaemia in 1960. This was the first consistent chromosomal change seen in a human cancer, and provided strong evidence that chromosome abnormalities have an important causative role in the initiation of carcinogenesis. With the introduction of improved chromosome imaging techniques, such as FISH, specific chromosome aberrations have been detected in very many tumour types, as tabulated in the now gigantic Mitelman database of all published cancer-associated chromosome aberrations. The database now contains more than 55,000 cases. These findings, together with the elucidation of many of the molecular-genetic consequences of the chromosome aberrations, have resulted in [the] original concept [put forward in 1914] now being very widely accepted.

The role of stem cells in carcinogenesis has been considered since the early 80s, but cancer stem cells were not isolated till the late 1990s, initially for haematological malignancies, and then in the early 2000s for solid tumours such [as] breast and brain and others. Cancer stem cells are considered to be the initiators of many or most tumours, through the stem cell processes of self renewal and differentiation into multiple cell types. The widespread acceptance that mutated stem cells represent an initial event in carcinogenesis in general, and radiation carcinogenesis in particular, parallel the growing acceptance of the relevance of cancer stem cells. An influential experiment, for example, was the demonstration in 2001 that normal human adult breast stem cells could be blocked from differentiation, and then could be oncogenically transformed by a combination of ionising radiation and an oncogene.”

An oncogene is a gene that contributes to the production of a cancer.

169. This represents a development of what Professor Brenner had said in his report of 6 November 2008 where he said this:

“There is independent evidence from large-scale epidemiological studies (in particular Japanese Atomic Bomb survivors, but also nuclear workers (Cardis *et al.* 2007)) that individuals exposed to radiation doses in this dose range have an increased lifetime risk of both cancer incidence and cancer mortality. For example, atomic bomb survivors exposed in 1945 in the dose range from 5 to 150 mSv (and followed up for many decades) show statistically-significant increased risks of both cancer incidence and cancer mortality (Preston *et al.* 2003, 2004, 2007). Atomic bomb survivors who received higher

doses have proportionately higher lifetime cancer risks (Preston *et al.* 2003, 2004, 2007).

In addition to the relevance of chromosome aberrations as biomarkers of past exposure to radiation, there is a well established mechanistic link between chromosome aberrations and cancer. In particular, the majority of all human cancers contain one or more of the same chromosomal aberrations in virtually all the tumour cells, implying that this/these chromosome aberrations must have been present in the original damaged cell(s) from which the tumour originated. This link between chromosome aberrations and cancer has been extensively catalogued, for example by Mitelman *et al.* (1997, 2008).

Finally, I will comment on the issue of the latency period between radiation exposure and the appearance of an associated cancer. A great deal is known about this issue, largely from the detailed follow-up studies of the Japanese atomic bomb survivors, whose cancer risk have been carefully monitored for more than half a century (Preston *et al.* 2003, 2007). What is well established from these studies is that, for solid tumours (as opposed to haematological cancers), the latency period is long, ranging from about 10 to at least 50 years. More precisely, the increased relative risk of cancer produced by radiation exposure is generally maintained throughout the lifetime of the exposed individual. Whilst a complete mechanistic understanding of radiation-induced cancer is not yet established, the reasons for this prolonged period of increased radiation-associated risk are qualitatively understood: radiation-induced cancers originate with radiation-induced damage to stem cells, which can be passed on to progeny stem cells when they divide. Thus the radiation-induced damage can remain latent in stem cells for many years until the damaged stem cell or one of its progeny starts to divide inappropriately as a result of the damage.”

170. Dr Lindahl broadly accepts this mechanism of injury in relation to cancers. In his report of 23 July 2008 he said this:

“Cancer usually results from inactivation of tumour suppressor genes. There are probably 20-50 major such genes. Cancer can also occur by activation of smaller numbers of specific oncogenes. In both the cases of tumour suppressor genes and oncogenes, the critical alteration is malfunction in the cellular signal transduction processes that results in uncontrolled cellular proliferation. Single site mutations with alteration of a single residue is one cause of a specific rare transformation of a normal cell to a malignant cell. Alternatively, this can occur by chain breaks in DNA with perturbations or rearrangements locally of the DNA sequence. This is triggered by chain breaks in DNA.... Because ionising radiation can generate a track of

reactive hydroxyl radicals, such radiation can damage DNA locally at multiple sites, including damage to both strands of DNA with a short region, and this may well result in a double strand break.”

171. Dr Lindahl has said that “[only] an extremely small proportion of such translocations would result in the rare conversion of a cell to a malignant cancer cell”, but this does appear to acknowledge the existence of the mechanism. It does appear, therefore, that irrespective of other views as to causation (see Professor Mothersill’s views at paragraphs 173-180), at least for the purposes of the limitation issue, the mechanism of the causation of at least some forms of cancer by virtue of exposure to ionising radiation can be taken as established. As will be seen in due course (at paragraphs 179 and 761), Professor Mothersill’s views do, of course, relate to outcomes of exposure to ionising radiation other than just cancer.
172. The essential question is whether the Rowland Report (see paragraphs 401-441) has so changed the scientific evidential landscape that it is an inescapable conclusion that the “knowledge threshold” within the Limitation Act has never (and could never) have been crossed until its promulgation or, if it has (or could have) been crossed at any earlier stage, whether the emergence of the report is a factor to which weight should be given in the section 33 exercise. I will return to these questions later, particularly at paragraphs 517 and 624-625.
173. It would be convenient to refer at this stage to the views of Professor Mothersill to which I have made oblique reference thus far. The Defendant has characterised her views which support the proposition “that virtually any illness can be caused by any dose of radiation” as “highly controversial”. She is described by the Defendant as merely a “radiobiologist” who is “not medically qualified”, nor “an immunologist”, whose theories on the “biological mechanisms by which injury might be caused (genomic instability/bystander effects and immune system compromise)” are not supported by current scientific understanding. The suggestion is, in effect, that her views are so far off received wisdom that they should be discarded. The principal source of this scepticism is undoubtedly Dr Lindahl who is very dismissive of her views. (Dr Tomas Lindahl FRS is a Swedish radiobiologist who joined in 1981 what was then the Imperial Cancer Research Fund, now Cancer Research UK, and is renowned for matters relating to DNA repair: see paragraph 420 below.)
174. Mr Gibson, of course, does not invite me to reach any conclusion on the scientific validity of Professor Mothersill’s views, although the strength of some of the assertions made about them are such that they would appear to be designed to send me a subliminal message. As I shall indicate later (see paragraphs 760, 810 and 850), any claim for damages based upon a collection of diffuse symptoms, perhaps manifesting themselves over a period of time, may face difficulties of proof of causation irrespective of any theory that might explain their evolution as a result of exposure to ionising radiation. But until the opportunity to test her views has taken place, Professor Mothersill is entitled to the same status as the other experts in the case.
175. Professor Mothersill, BSc, PhD, is a Professor of Radiobiology in the Department of Medical Physics and Applied Radiation Sciences, McMaster University, Hamilton, Ontario, who for 20 years prior to 2003 had been, firstly, a lecturer in medical physics

and radiation biology at the Dublin Institute of Technology and thereafter Scientific Director of the Radiation and Environmental Science Centre there. From 2003 onwards she has been based at McMaster University.

176. There is little purpose to be served by setting out an extended description of the concepts of “genomic instability”, “bystander effects” and “immune system compromise”, all concepts of significance in Professor Mothersill’s analysis. I will endeavour to describe them briefly, but it is, I think, important to understand that her views are shared by others and the field of research in this area has been developing significantly over the last 10-20 years. There seemed at one stage to be a suggestion that she held these views almost in isolation from anyone else. I do not think that the evidence as it stands justified that suggestion: indeed quite the contrary.
177. The position she advances is that new research has demonstrated that ionising radiation causes damage through “genomic instability” and “bystander effects”. “Genomic instability” means “an increased probability of or tolerance of mutations in the genome which is transmissible to progeny of cells and to future generations of individuals” and it is this mechanism by which, according to Professor Mothersill, “low doses of radiation are now thought to cause delayed or persistent damage to chromosomes.” “Bystander effects” arise when, for example, chromosome or DNA damage occurs in cells not themselves directly irradiated but by virtue of the effects upon those cells of other nearby cells irradiated with low doses of radiation.
178. Professor Mothersill’s summary of what “genomic instability” means in this context is as follows:

“...Any disease *could* be caused by an exposure [to a low dose of ionising radiation] as ultimately our genes determine which proteins are expressed in ourselves and thus control our responses to disease situations. Genomic instability is turned on by extremely low doses of radiation and can be triggered in bystander cells as well. Bystander cells received signals from irradiated cells but do not experience the ionising tract. A further important fact is that genomic instability is a delayed effect of radiation which may not be immediately apparent. The LNT [Linear Non Threshold] model which is used by all radiation protection authorities predicts that any dose no matter how small has a finite probability of causing a cancer due to the ability of radiation to cause DNA damage. The finding of excess chromosome translocation frequencies in the veterans is consistent with this and also with the presence of genomic instability in these individuals. What genomic instability theory does is that it widens the spectrum of diseases inducible by radiation and the time over which these might appear.”

179. Professor Mothersill goes on to say this:

“It was well established (long before Dr Rowland’s report) that ionising radiation can cause certain illnesses, including (but not limited to) cancers. It follows that, if, as Dr Rowland found, the veterans were exposed to ionising radiation, then this

materially increased the risk of the veterans suffering the illnesses from which they have actually suffered.”

180. Against that background, Professor Mothersill has lent her support to the causal link between their exposure to ionising radiation and certain conditions from which they have suffered on the part of some, but not all, of the Lead Claimants in this case. Her support is expressed on the basis that their exposure to ionising radiation materially increased the risk of their developing the conditions specified.
181. It follows from all this that, as things stand and without the evidence being fully tested, there is expert support for an explicable link between exposure to ionising radiation and most, if not all, of the conditions sought to be relied upon by the Claimants, either by virtue of (i) the direct effect upon DNA and potential cancerous growth as a result or (ii) the indirect effects by way of bystander effects and consequent genomic instability. Whether that support would translate into a finding that causation had been established in any case would, of course, depend upon the view taken about such evidence at the trial of the substantive cases if such a trial takes place. But, as I have said, on the evidence as it stands, the necessary link is established for most, if not all, of the conditions relied upon.
182. That conclusion is not of itself an answer to the argument advanced by Mr Gibson that all the cases are doomed to fail on the issue of causation because the wrong legal test is being applied by the Claimants. I deal with that issue in section 14 of this judgment. I can, however, deal conveniently now with a submission made by Mr Gibson that I will characterise as “Causation – the evidential issues”.

13. Causation – the evidential issues

183. Although the trial has been about limitation, causation has been a major focus during the proceedings. Mr Gibson recognised that it was “not a trial of causation”, but nonetheless made a number of forceful points about what he argues is the misconceived nature of the causation case advanced on behalf of the Claimants.
184. He submits that “it is notable that there is not a single report from a medically qualified expert to substantiate causation in any of the Lead Cases, still less the rest of the group.” He contends that “[the] attempt to prove causation in the Lead Cases by means of generic (and extremely general) evidence is fundamentally misconceived.” It is this aspect of his submissions that I will deal with now.
185. For my part, I consider that this aspect of the argument can be disposed of fairly shortly. I have already indicated (paragraphs 66 and 69) that the way in which the case has been pleaded has, as it seems to me, dealt adequately with the way in which causation is to be advanced as a general issue. Obtaining individual reports in each case would have been a disproportionate way of proceeding in an action of this nature. As it is, there is evidential support for causation in each of the Lead Cases as I will indicate when dealing with each of them in greater depth in section 19 of the judgment. Whether that support would be sufficient to establish causation at any trial of the substantive claims would, of course, be another matter. In that connection, Mr Browne says that, from the Claimants’ point of view, the evidence may not yet be complete.

186. In circumstances that provoked controversy between the parties, the Defendant took the terms of an order made by consent on 16 September 2008 to permit the obtaining and service of individual medical reports in each of the Lead Cases. In each report the author disavowed any possible link between exposure to ionising radiation and the injury or condition of which complaint is made. The Claimants' advisers had not seen the consent order in this way and objected that they had been the victim of an "ambush". When the matter came before me on 12 December 2008 for a Case Management Conference (when I had had only a few days notice of my involvement), the parties sensibly left that issue to one side and it was agreed that the Claimants could, if they so chose, try to obtain further evidence. In the event, no further expert evidence was submitted on the Claimants' behalf apart from a report from a well-known respiratory physician, Dr Moore-Gillon, which was of a rather more generic nature than a report on an individual case. Service of that report produced protest from the Defendant's team.
187. As I said at an early stage in this judgment (paragraph 6), a good deal of the argument, both on paper and orally, has focused on the overall merits of the case. On this particular feature of the causation issue, I would merely hold that the lack at this stage of individual medical reports in each individual case supporting a causation approach is not fatal to success on the limitation issue. There is, in my view, sufficient material available at this stage to support the (adequately) pleaded case. I need go no further than that for present purposes. Again, this does not answer the more fundamental point made about the test to be applied for causation purposes, to which I will turn in section 14 of the judgment where I deal with the whole question of whether the claims should be struck out now because they are "doomed to fail" on the issue of causation.

14. Strike out/abuse of process

(i) the general approach

188. I have adverted to the position taken by the Defendant in paragraph 182. It is argued that none of the Lead Cases can succeed on the grounds of causation irrespective of any issues as to breach of duty and, accordingly, each is doomed to fail. In each of the Lead Cases Mr Crossley has made the following assertion in the witness statement he has produced in relation to each individual case:

It is the Defendant's case that this claim is bound to fail and is therefore capable of being struck out or dismissed on summary judgment as having no reasonable prospect of success.

189. As I have already indicated in paragraph 55, no specific application to strike out or dismiss has been made in relation to any of those cases, whether under CPR 3.4 or CPR 24.2. The court does not, of course, need an application as such to make such an order. It can act on its own initiative: CPR 3.3(1). It was suggested to me that the case management powers under CPR 3.4(2) are those that I am being invited to exercise although there is a well-recognised overlap between those powers and the jurisdiction under CPR 24.2 (see paragraph 3.4.6, Civil Procedure – The White Book 2009, Vol. 1). The formulation in Mr Crossley's witness statements is apt to cover both. Reliance is also placed on the court's inherent jurisdiction: see paragraph 3.4.5, Civil Procedure – The White Book 2009, Vol. 1.

190. As I understood the argument, it was that if there was a case that might otherwise not be statute-barred or, if it was, in respect of which I might be disposed to exercise a favourable discretion under section 33, but in respect of which I was satisfied that it stood no reasonable prospect of success on the basis of the way in which it had been pleaded or by reference to the evidence before the Court, then it would be appropriate in those circumstances for me to consider to exercise the Court's duty, as Mr Gibson contends it exists, to strike it out. Reliance is placed on what Lord Nicholls of Birkenhead said in *Phelps v Hillingdon London Borough Council* [2001] 2 AC 619 at page 667 of the Court's "enhanced" case management powers when faced with an "obviously hopeless" case. Although Mr Gibson also relied upon the approach of Lord Diplock in *Hunter v Chief Constable of the West Midlands Police* [1982] AC 529, he recognised that the current powers to act in this way are essentially to be found in the CPR. CPR 3.4(2) provides as follows:

The court may strike out a statement of case if it appears to the court –

(a) that the statement of case discloses no reasonable grounds for bringing or defending the claim;

(b) that the statement of case is an abuse of the court's process or is otherwise likely to obstruct the just disposal of the proceedings; or

(c) that there has been a failure to comply with a rule, practice direction or court order.

191. This power to strike out is explained in paragraph 1.4 of the Practice Direction as including claims "which are incoherent and make no sense" and "those claims which contain a coherent set of facts but those facts, even if true, do not disclose any legally recognisable claim against the defendant".

192. It is not, of course, in issue that the court has possessed "enhanced powers of case management" since the introduction of the CPR and should, where appropriate, "weed out" an "obviously hopeless" claim "as expeditiously as is consistent with the court having a sufficiently full factual picture of all the circumstances of the case": *per* Lord Nicholls of Birkenhead in *Phelps*. However, the court will not do so where the claim advanced is "arguable" (as in *Phelps*) and caution is always exercised where the relevant area of law is uncertain and developing: *Hughes v Colin Richards & Co* [2004] EWCA Civ 266. In that case Peter Gibson LJ said this:

"I start by considering what is the correct approach on a summary application of the nature of Mr. Richards's application at this early stage in the action when the pleadings show significant disputes of fact between the parties going to the existence and scope of the alleged duty of care. The correct approach is not in doubt: the court must be certain that the claim is bound to fail. Unless it is certain, the case is inappropriate for striking out"

He continued by quoting from what Lord Browne-Wilkinson said in *Barrett v Enfield London Borough Council* (see paragraph 203 below).

193. The Defendant argues that *Hughes v Colin Richards & Co* does not help the Claimants. It is argued that it was a case seeking to strike out the Particulars of Claim at the *interlocutory* stage, before there had been any findings of fact, whereas in the present cases the Court has heard oral evidence and “will be making findings of fact on (critically) the injuries complained of and thus whether they are recoverable in law or are bound to fail”. It is also submitted that *Richards* was concerned with the *scope* of the duty of care (which the courts have been reluctant to deal with at an interlocutory stage), but the issue here is the correct test for causation (and whether causation can be proved according to that test) and the question is not an interlocutory one - the relevant facts (the injuries) can and should be found. It is also argued that the law is not uncertain: the Claimants, it is said, have simply misunderstood the test as to causation and that I am bound to apply the law as it stands, without regard to any possibility of any future development of the law: *Baird Textiles Holdings Ltd v Marks & Spencer plc* [2001] EWCA Civ 274.
194. To a degree I acknowledge the force of some aspects of those submissions. However, the question of whether some (or all or any) of the Lead Cases should be assessed as “bound to fail” on the issue of causation if otherwise surviving the limitation arguments is, in my judgment, very much less straightforward in this case than is suggested in those submissions. In one sense, a limitation issue can be said to arise even before a true interlocutory stage has been reached within proceedings seeking damages for personal injuries. However, irrespective of that, it must be borne in mind that any finding of fact that I may make at this stage of these proceedings is simply whether “the injury in question” in a particular case was “significant” and “attributable in whole or in part” to the Defendant’s acts or omissions in the sense that those expressions require (see section 16 of the judgment) at a time relevant to the institution of the present proceedings. Any such finding is relevant solely to the limitation argument. It would not in the event of a trial bind the trial judge on any material issue since the responsibility at that stage would be to consider, on the basis of all the evidence deployed, whether any breach of duty found to exist caused (by whatever legal test is appropriate) the injury, illness or condition in question. The process at this stage does not involve deciding whether, as a matter of law or fact, causation is or will be established (cf. the observations of Lord Hoffmann in *Adams v Bracknell Forest BC* [2005] 1 AC 76, at para. 24). If, of course, it is plain beyond any doubt that, whatever legal test is applied, the necessary causal link could never be established on the facts, it may be appropriate to exercise the jurisdiction to strike out. But if it is arguable, on the law as it stands, that causation can be established in any particular Lead case then there would be no basis for invoking that jurisdiction.
195. What is the basis for the Defendant’s contention that causation is unarguable in each of the Lead Cases? In essence what is said is that the claims fall to be assessed by reference to the approach in *Wilsher v Essex Area Health Authority* [1988] AC 1074 and that the exception to the general rule articulated in *Fairchild v Glenhaven Funeral Services Ltd and others* [2003] 1 AC 32 cannot apply in these cases. The reason for so submitting is based upon a concession made on behalf of the Claimants in the Opening in the following terms:

“All of these illnesses also occur when there is no known history of exposure to ionising radiation and in all cases there are known to be other identifiable risk factors, such as smoking. In the event that it is possible to identify more than one risk factor medical science is not able to say which of those risk factors as a matter of probability caused the development of the condition. All that can be said is that the condition has developed and that there are a number of risk factors each of which is likely to have played a material part in the causation of the ill-health.”

196. In fact the relevant paragraph of the Opening continued with the following sentence:

“Against that background where the condition complained of by the veterans is known to be radiogenic the Claimants will contend that causation is proved and will rely upon *Bailey v. Ministry of Defence & Another* [2008] EWCA Civ 883, (2008) LS Law Medical 481.”

197. The Opening went on to assert that that whilst it may not be possible to establish that each of the conditions complained of in the proceedings is known on long-standing research to be radiogenic, very many of the conditions have been identified thus with the result “that causation will in all such cases be established.” Reference is also made to Professor Mothersill’s views (see paragraphs 173-180) and it is asserted that “many other conditions which are not classically regarded as radiogenic may also be causally related” to exposure to ionising radiation.

198. I will deal later (see paragraphs 223-237) with issues arising from the case of *Bailey v. Ministry of Defence & Another* and other cases raising causation issues since *Fairchild*. However, I must return to the way the Defendant’s argument in this particular context is articulated. What is said is that the foregoing concession means that, even though it is not agreed by the Defendant that each of the risk factors “is likely to have played a material part in the causation of the ill-health”, there are, on the Claimants’ case, a number of possible “risk factors” (i.e. potential causes) of the illnesses alleged and it cannot be proved which risk factor (including exposure to ionising radiation) is the *probable* cause. Since there are multiple agents that could have caused the Claimants’ illnesses and that it cannot be proved which out of the possible causes was the most probable, the approach in *Wilsher* governs the position, is binding upon the Court and the conclusion should be that the Claimants will accordingly fail to establish causation. It is said that the *Fairchild* exception, as it has become known, is inapplicable to the circumstances of this case and those circumstances “are also well outside any foreseeable extension the House of Lords might make to” it. It is said that the claims are as a result “clearly doomed to fail”.

199. Whilst, for reasons that may become apparent, it is difficult to compartmentalise the response to the various strands of this argument (and indeed the endeavour to do so may strain the analysis) it seems to me that the important initial issue for present purposes is what course I should adopt if I were of the view that some or all of the cases required some modification of the present formulation of the principles of causation to accommodate the particular claim. If the claims in this case generally, or certain individual cases forming part of the group litigation, require some extension or

analogical development of the *Fairchild* exception, does that mean that I must strike out any such claim because the House of Lords has not yet said that such an exception is permitted?

200. In fact, for reasons I will give later (see paragraph 230), I do not consider it appropriate to strike out any of these claims on the general basis that they are “doomed to fail” on causation because I consider the general attack made by the Defendant to be premature – indeed, subject to the “broad merits” issue under section 33 if it arises, I do not see how issues of causation in this case can be dealt with other than at trial. However, if my decision in that regard should be the subject of challenge, it is right that I should indicate the view I would have taken had the sole issue been that identified in the preceding paragraph. My analysis of that issue now follows.
201. A trial judge at a full trial decides the facts and applies the law as it stands to those facts. If the effect of the application of the law as it stands is that a claimant in a personal injuries claim fails on the issue of causation, then the only way the claimant could ultimately succeed would be to seek a modification or re-statement of the law relating to causation. If in this case that modification or re-statement required an extension or development of *Fairchild* then it would be for the House of Lords, if it thought appropriate, to extend the law to enable the claim to succeed: cf. *Clough v First Choice Holidays* (2006) PIQR P22, CA. But to what extent is it necessary or appropriate for a first instance judge to strike out a claim where, as pleaded or on the basis of the evidence currently deployed, the claim may not fit neatly and obviously within the established *Fairchild* exception?
202. There are two aspects to the consideration of this issue: (a) the general approach and (b) the approach to the particular circumstances of this case.
203. The general approach does in some respects involve a tension between two competing considerations: first, the need for the system of precedent to be observed to ensure consistency of decision-making and for the law to be treated as established; second, the need to ensure that the law can develop to meet new factual situations. The consistent approach of the House of Lords would appear to be that so far as the latter is concerned, the preference is to consider real issues based upon established facts rather than upon the assumed basis necessary for the purposes of a strike out application. As will appear below, authoritative statements of this general proposition appear in *Barrett v Enfield London Borough Council* [2001] 2 AC 550. That case involved a claim for damages for personal injury arising out of the alleged negligence of the defendant local authority brought by a claimant who had been placed in care pursuant to a care order when he was 10 months old and remained there until the age of 17. The alleged breaches of duty included a failure to arrange for his adoption or provide him with appropriate and properly monitored placements, a failure to obtain appropriate psychiatric treatment for him and mismanagement of the reintroduction to his mother, as a result of which he claimed he suffered from deep-seated psychological and psychiatric problems. The Court of Appeal (Lord Woolf MR, Evans and Schiemann LJJ) had upheld a decision to strike out the claim. In broad terms, Lord Woolf MR considered that there was no reasonable prospect of the claimant establishing the existence of a duty of care, the breach of such a duty if it existed and any causal connection between any breach established (“operational acts done carelessly”) and the kind of injury alleged. As Lord Browne-Wilkinson put it (at

p. 557), “Evans and Schiemann LJJ reached the same conclusion, though both placed more emphasis on the inability of the [claimant] to show a causative link between any negligence capable of being proved against the defendants and the psychiatric damage alleged to have been suffered as a result of such negligence.” However, the House of Lords reinstated the claim, emphasis being placed on the desirability of the facts having been established before these kind of issues are addressed. Lord Browne-Wilkinson (at page 557) said this:

“In my speech in the *Bedfordshire* case [1995] 2 AC 633, 740-741 with which the other members of the House agreed, I pointed out that unless it was possible to give a *certain* answer to the question whether the plaintiff’s claim would succeed, the case was inappropriate for striking out. I further said that in an area of the law which was uncertain and developing (such as the circumstances in which a person can be held liable in negligence for the exercise of a statutory duty or power) it is not normally appropriate to strike out. In my judgment it is of great importance that such development should be on the basis of actual facts found at trial not on hypothetical facts assumed (possibly wrongly) to be true for the purpose of the strike out.”

204. In relation to the causation issue he said this:

“Therefore unless it can be said (as did the Court of Appeal) that operational carelessness could not have caused the damage alleged in the present case it would be impossible to strike out any part of the claim. But causation is quintessentially a matter of fact and one would have thought that where there is a substantial doubt as to what is an operational decision there must equally be doubt as to the extent or nature of the damage capable of being caused by negligence in making such an operational decision.”

205. The late Lord Slynn of Hadley, having noted the views of the Court of Appeal, said this (at page 574):

“In the present case each member of the Court of Appeal appears to have taken the view that the plaintiff would not be able to show that operational acts, even if negligently performed, either separately or cumulatively caused the condition of which the plaintiff complained. But causation is largely a question of fact. In the light of evidence of [certain identified experts] it would not be right to rule on an application to strike out that the matters complained of as injury could not have been caused either by particular events or by the accumulation of matters which are relied on in the statement of claim.”

206. Lord Hutton (at page 590) expressed himself as follows:

“However, the issue of causation arises in a different way if, as I would hold, the plaintiff is entitled to allege negligence against the defendant in the exercise of its statutory discretion. If the plaintiff can succeed in establishing negligence on the part of the defendant ... he may well face a very difficult task in seeking to establish that that negligence was a cause of the psychiatric injury in respect of which he claims. But causation is largely an issue of fact to be determined on the evidence, and having regard to the last sentence in the passage of the report of the plaintiff’s psychologist which I have set out in an earlier part of this judgment, I consider that it would not be right to strike out the claim on the ground that the plaintiff had no real prospect of establishing causation.”

207. In the context of that case the House of Lords was plainly of the view that the issues of law should not be addressed until the facts had been found. It was this that led Judge LJ, as he then was, in *Baird Textiles Holdings Ltd v. Marks & Spencer plc* (see paragraph 193 above), upon which the Defendant in this case relies, to articulate the tension identified above in this way:

“ ... I am persuaded ... that there is no real prospect of the claim succeeding unless and until the law is developed, or corrected, by the House of Lords. In my judgment however, such a possibility would not normally justify a case proceeding to, nor provide a compelling reason for trial. However settled the law may appear to be, one of its strengths is that the possibility of development, or change, remains. In my view, even for the purposes of CPR 24.2, we must apply the law as it is, not as it may possibly one day become

I do not believe that this approach means that the development of the law is likely to be stultified. If for example, there were a significant conflict in the authorities, or if the law could reasonably be described as uncertain, or perhaps also, if there were a substantial body of academic or judicial opinion that the law as currently understood produced injustice and should be considered by the House of Lords, but simultaneously the essential facts were heavily in dispute, considerations such as these might provide a compelling reason for trial. Although the House of Lords in *Barrett v Enfield LBC* ... has recently emphasised that the law should be developed on the basis of established rather than assumed facts, in this case, as I have explained, many of the essential facts are not in reality in dispute.”

208. The *Baird Textiles* case involved an application under CPR 24.2 (not the exercise of the jurisdiction under CPR 3.4) which does, of course, entitle a court otherwise persuaded to give summary judgment to decline to do so if there is some “other compelling reason why the case ... should be disposed of at a trial”. More importantly, though, it involved a situation where, as Judge LJ said, many of the essential facts were not in dispute. I do not think it is possible to say the same of the

factual position in this case. I will say more about this in paragraph 227-230 below. Equally, however, there are strong observations in *Barrett* that causation is “largely” or “quintessentially” an issue of fact. Again, I will return to this below (paragraph 220).

209. For completeness, I should add that whilst I was not referred specifically to *The Claimants appearing on the Register of the Corby Group Litigation v Corby Borough Council* [2008] EWCA Civ 463, it has some relevance in this context. It is a group action in which the claimants allege that their mothers, who lived close to land acquired by the Council from the British Steel Corporation, were exposed during the embryonic stage of their pregnancies to toxic materials in the course of the Council’s reclamation and decontamination programme in respect of the land and that this exposure caused the deformities seen in the claimants. In response to an order to serve additional points of claim setting out their allegations of breach of duty and how the breaches were alleged to have caused the injuries the claimants, inter alia, sought to add a claim based on public nuisance. The Council applied to strike out that claim on the basis that, as a matter of law, damages for personal injury cannot be recovered for public nuisance. The argument shortly was that the longstanding assumption in previous cases that damages for personal injury are recoverable in public nuisance was wrong and inconsistent with the decisions of the House of Lords in *Hunter v Canary Wharf Limited* [1997] AC 655 and *Transco plc v Stockport MBC* [2003] UKHL 61, [2004] 2 AC 1.
210. The Court of Appeal held that the long-established principle that damages for personal injury can be recovered in public nuisance had not been impliedly reversed by either of these two decisions of the House of Lords, but accepted that the House of Lords may decide to take that course whilst it was not open to the Court of Appeal to do so. Dyson LJ (with whom Ward and Smith LJJ agreed) said that “[the] fact that the law may be developed by the House of Lords ... is not a reason for this court not to apply the law as it now stands.” He also said that even if precedent had not prevented the court from deciding the question of whether damages for personal injuries can be recovered in public nuisance, he would not have refused the application for permission to amend the particulars of claim to add a claim in public nuisance. He “would have held that this important question of law should be decided following full argument after a trial when all relevant facts had been found.”
211. I will return to a summation of the effect of these decisions later (paragraph 220), but there is, in my judgment, a strong trend within them to the effect that the question of possible development of the law by the House of Lords should follow on from factual findings giving rise to the question rather than the question being addressed on the basis of an assumed factual scenario. As Lord Browne-Wilkinson (with whom Lords Nolan and Steyn expressly agreed) said in *Barrett* (at page 560), “this action should proceed to trial and when all the facts are known the difficult issues of law which may arise may be confronted in the light of the real, as opposed to hypothetical, facts.”
212. Leaving aside, therefore, the effect of subsequent authorities (also binding on me) that arguably have already extended the *Fairchild* exception (see paragraphs 223-237), the issue for present purposes is whether, if it be right that the cases plainly cannot be brought within *Fairchild*, I must strike them out as having no reasonable prospect of success.

213. In *Fairchild* Lord Bingham of Cornhill (at paragraph 9) identified the issue in the appeals as “whether in special circumstances such as those in these cases there should be any variation or relaxation of” the “but for” test of causation. He introduced the matter in this way:

“The overall object of tort law is to define cases in which the law may justly hold one party liable to compensate another. Are these such cases? A and B owed C a duty to protect C against a risk of a particular and very serious kind. They failed to perform that duty. As a result the risk eventuated and C suffered the very harm against which it was the duty of A and B to protect him. Had there been only one tortfeasor, C would have been entitled to recover, but because the duty owed to him was broken by two tortfeasors and not only one, he is held to be entitled to recover against neither, because of his inability to prove what is scientifically unprovable. If the mechanical application of generally accepted rules leads to such a result, there must be room to question the appropriateness of such an approach in such a case.”

214. As is well-known, the House of Lords did indeed make an exception to the general rule but there was acknowledgement that the principle established in the case might be developed. By way of example Lord Bingham put it this way:

“It would be unrealistic to suppose that the principle here affirmed will not over time be the subject of incremental and analogical development. Cases seeking to develop the principle must be decided when and as they arise.”

215. Lord Nicholls of Birkenhead (at paragraph 43) said this:

“I need hardly add that considerable restraint is called for in any relaxation of the threshold “but for” test of causal connection. The principle applied on these appeals is emphatically not intended to lead to such a relaxation whenever a plaintiff has difficulty, perhaps understandable difficulty, in discharging the burden of proof resting on him. Unless closely confined in its application this principle could become a source of injustice to defendants. There must be good reason for departing from the normal threshold “but for” test. The reason must be sufficiently weighty to justify depriving the defendant of the protection this test normally and rightly affords him, and it must be plain and obvious that this is so. Policy questions will loom large when a court has to decide whether the difficulties of proof confronting the plaintiff justify taking this exceptional course. It is impossible to be more specific.”

216. Lord Hoffmann put it this way (at paragraphs 73 and 74):

“The question is how narrowly the principle developed in *McGhee's* case and applied in this case should be confined. In

my opinion, caution is advisable. *Wilsher's* case shows the dangers of over-generalisation. In *Rutherford v Owens-Illinois Inc* ... the Supreme Court of California, in a valuable and lucid judgment, said that in cases of asbestos-related cancer, the causal requirements of the tort were satisfied by proving that exposure to a particular product was a substantial factor contributing to the "plaintiff's or [descendant's] risk of developing cancer": see p 32. That is precisely the rule your Lordships are being invited to apply in this case. The Californian Supreme Court stated the principle specifically in relation to asbestos-related cancer cases. No doubt it could also apply in other cases which were thought to have sufficient common features, but that was left for decision on a case-by-case basis. Likewise I would suggest that the rule now laid down by the House should be limited to cases which have the five features I have described.

That does not mean that the principle is not capable of development and application in new situations...."

217. Lord Hutton said (at paragraph 118) that "[it] may be necessary in the future to consider whether the *McGhee* principle should be applied to other cases, but such decisions will have to be taken when such cases arise." Lord Rodger of Earlsferry (at paragraphs 169 and 170) "tentatively [suggested] ... certain conditions ... necessary" for the principle to be applied in other cases whilst acknowledging the need for "considerable restraint" in doing so.
218. There can be no doubt, therefore, that their Lordships were of the view that the principle enunciated in *Fairchild* could be applied by "incremental and analogical development" to other cases and to new situations, albeit with appropriate caution. Any such development would occur, if it was to occur at all, on a case-by-case basis. In *Chester v Afshar* [2005]1 AC 134, Lord Steyn said that "... *Fairchild* shows that where justice and policy demand it a modification of causation principles is not beyond the wit of a modern court."
219. So where does this lead on the question of strike out? Since my general conclusion on the strike out issue is as I have indicated (see paragraphs 200 and 230), it is not, strictly speaking, necessary for me to grasp the nettle of deciding whether, if an extension or modification of the *Fairchild* exception would be necessary for some or all of the Claimants to succeed, I should strike out those claims now (applying strictly the law as it presently stands) or permit them to go to trial when the full facts and arguments can be examined before, if it proves to be the case, the relevant claims are pursued to the House of Lords (or Supreme Court as it will be by then) for consideration of whether an extension or modification of *Fairchild* is considered appropriate. Lest it be thought, however, that the decision I make on other grounds is designed to avoid that difficult decision, I will state the decision I would have made had it been necessary.
220. In my judgment, it would not have been appropriate to exercise the discretion to strike out the claims in the particular circumstances of this case. The reasons, which represent an amalgam of the effect of the authorities to which I have referred in

paragraphs 201-211 above and the need to further the overriding objective in what are essentially personal injury claims, can be summarised as follows:

- i) Establishing causation in a particular case is essentially a matter of fact (paragraphs 204-206) although the formulation of the principle or principles upon which that factual issue is considered is a matter of law.
- ii) The preferred basis for the development of legal principles by the House of Lords is on the basis of real, rather than assumed, facts (paragraphs 203-211).
- iii) Unlike a case such as *Baird Textiles* (paragraphs 193 and 207), where the House of Lords had not explicitly indicated the possible modification of the law contended for, in the present context the House of Lords in *Fairchild* has acknowledged the possibility of the development of the principle therein enunciated.
- iv) The fair, efficient and proportionate deployment of resources (including judicial resources) would be for the complex factual issues in the individual cases to be considered at trial (the trial judge, of course, being bound by the law as it is) and for the consequences of the findings made at trial to be the subject of consideration at the highest level thereafter if necessary and if the necessary permissions to do so are granted.

221. The consequences of a decision to the contrary effect on the strike out issue could well result in costly and time-consuming preliminary proceedings that may not take forward in an ultimately constructive way the essential issues in the case. Whilst it is, of course, possible that others may take a different view, I would not, for my part, have seen the utility of the strike out procedure being adopted at this stage in these cases even if some or all did not appear to fit neatly and obviously within the established *Fairchild* framework. However, as I have indicated (see paragraphs 200 and 230), I do not base my ultimate decision on this aspect of the arguments addressed on that view of the appropriate practice to adopt.

222. Whilst I have endeavoured to deal with this as a discrete issue, there is arguably some overlap between the considerations to which I have referred and my assessment of the current state of the evidence and the authorities on causation that have post-dated *Fairchild*. I will move to deal with these matters next.

(ii) the current state of the evidence and the post-*Fairchild* authorities

223. I am anxious not to extend a lengthy judgment by referring to more than those authorities that are truly necessary to determine the real issues in this case. A detailed exegesis on the many cases dealing with causation issues, both before and after *Fairchild*, is unnecessary. The path has been well trodden and those interested in the field will have a good appreciation of the issues that can arise. A good appreciation of the issues that can arise does not necessarily mean that the application of the principles to be deduced from the decided cases is always easy. The whole field of causation has exercised many distinguished legal minds over the years.

224. Traditionally, injuries or conditions are classified as “divisible” or “indivisible”. An “indivisible” injury or condition is characterised as being “all or nothing” in the sense

that the attribution of different parts of the injury or condition to different causes is not possible whereas such attribution is possible with a “divisible” injury.

225. *Fairchild* concerned mesothelioma, a cancer of the mesothelial cells. Although none of their Lordships used the word “indivisible” in the opinions given, it was common ground that mesothelioma is an indivisible condition. Although the House of Lords differed in its approach from the approach that had been adopted by the Court of Appeal, the following extracts from the judgment of the Court of Appeal bring into relief the distinction between the two types of injury:

“It is now necessary to distinguish between mesothelioma and asbestosis. Both diseases are caused by exposure to dust, but mesothelioma has been described, because of its aetiology, as an indivisible disease, whereas asbestosis has been described as a divisible, or cumulative, disease. This distinction is very important in this case.

Mesothelioma arises when one of the mesothelial cells in the pleura is damaged and undergoes malignant transformation. A tumour then develops from that single malignant mesothelial cell. The precise mechanics of the disease are still not known, but it is received medical opinion that at least 90% of cases of mesothelioma result from exposure to asbestos

...

It was ... common ground on these appeals that it could not be said whether a single fibre of asbestos was more or less likely to have caused the disease, alternatively whether more than one fibre was more or less likely to have caused the disease. In the latter event, it could not be shown that it was more likely than not that those fibres came from more than one source. In other words, none of these scenarios could be proved on the balance of probabilities. Similarly, it could not be proved on the balance of probabilities that any one man’s mesothelioma was caused cumulatively by exposure to asbestos dust in more than one employment.

...

Mesothelioma is therefore an all or nothing disease. It is thus different from asbestosis (or pneumoconiosis) which are cumulative diseases. Mesothelioma is triggered off on a single unidentifiable occasion when one or more asbestos fibres initiate the process which leads ultimately, many years later, to the diagnosis of the disease. Asbestosis is different. There is a minimum dose of asbestos below which there is no risk that asbestosis will develop. Above that minimum dose the severity of the condition, if it does develop, increases in relation to the total dose of asbestos inhaled.”

226. The solution the House of Lords found to the injustice created for a claimant who had been wrongfully exposed to asbestos dust by more than one tortfeasor, but who could not prove which one had been responsible for the fibre or fibres that caused the mesothelioma, was to permit an action against any of them, the basis of the liability being that each tortfeasor had materially increased the risk of contracting the mesothelioma. In *Fairchild* the issue of the extent of the liability of the tortfeasor found liable was not raised or resolved and, accordingly, the “guilty” tortfeasor took responsibility to the extent of 100%. In *Barker v Corus UK Limited* [2006] 2 A.C. 572 the House of Lords (Lord Rodger of Earlsferry dissenting) held that it was appropriate to apportion responsibility for the condition directly as between the claimant and any guilty tortfeasor by reference to the extent of the exposure to asbestos. This decision was reversed in relation to mesothelioma by virtue of section 3 of the Compensation Act 2006. But the issue remains as to the extent to which the decision could have an impact on analogous cases.
227. In *Barker v Corus*, the narrow scope of the exception created in *Fairchild* to the normal rule as to causation was reaffirmed (see, e.g., Lord Hoffmann at paragraph 1 and Lord Scott of Foscote at paragraph 57). However, it is appropriate to note that Lord Walker of Gestingthorpe (at paragraph 111), with whom Baroness Hale of Richmond expressly agreed on the issue (at paragraph 121), confirmed the proposition that whether damage is divisible or indivisible is a matter of fact and that there may be debateable borderline cases where that which is divisible or indivisible may not be immediately recognisable.
228. If the issue whether an injury or condition is divisible or indivisible is a question of fact that it is important to resolve before deciding on the question of causation, the further question arises as to the propriety of taking a pre-emptive decision to strike out a claim before the fact of the divisibility or indivisibility of the condition has been established. As I have indicated, it would only be at that stage that the application of the principles to be deduced from the authorities could arise. It would be idle to suppose that a condition such as mesothelioma would now be treated by anyone as something other than an indivisible condition, but can the same be said with an appropriate degree of confidence of the conditions, disabilities and injuries alleged to have been caused in the claims in the present litigation?
229. *Wilsher*, upon which the Defendant places considerable reliance, was a case where (as Lord Bingham of Cornhill put it in *Fairchild* at paragraph 22) “any one of a number of noxious agents may equally probably have caused the damage.” It does not seem to me that the concession to which Mr Gibson attaches so much significance (see paragraph 195 above) amounts to a concession that this is quite so obviously so in respect of all the conditions in the claims being advanced here. Indeed the Claimants say that, on the basis of the present evidence (which is not complete in any event), those cases that do have potentially different causes operating (e.g. that of the late Mr Brothers) establish causation by virtue of the causes operating by a similar mechanism and synergistically. Reliance is placed upon the views of Professors Parker and Mothersill to this effect. (An example of where this approach to the causation of lung cancer was adopted is the case of *Shortell v Bical Construction Limited*, see paragraphs 100 above and 741 below.)
230. For my part, I would be content to reject the suggestion that I should strike out any of the claims as “doomed to fail” on the issue of causation largely because causation is

essentially a matter of fact (see paragraphs 204-206), the nature of the injury or condition in question is an issue of fact (see paragraph 227) and the facts (dependent upon both the lay and expert evidence) are a long way from being established at this stage in the proceedings. Until the facts have been established it is not possible to know whether the individual case is governed by *Wilsher* or by some other approach to the test for causation. That does not mean that in some cases there might not be difficulties of proving causation. However, that does not seem to me to be a sufficient basis for the draconian measure of striking out the claims at this stage. To the extent that it is possible to do so, I will be obliged to form a very general view of the position at the section 33 stage, but I do not see any basis for striking out the claims at this stage.

231. Whilst the foregoing represents the basis for my decision on this issue, it is reinforced to a degree by a series of recent cases in the Court of Appeal which reflect, as I perceive them, the working through of the analogical and incremental development on the *Fairchild* principle – or at least its elucidation. If that means that the law is developing or uncertain then, in accordance with normal principles (see paragraph 203), that would be another ground for resisting the suggestion that the claims should be struck out at this stage. There are three principal cases to which my attention has been drawn: *Novartis Grimsby Ltd v Cookson* [2007] EWCA Civ 1261, *Bailey v Ministry of Defence* [2008] EWCA Civ 883 and *Sanderson v Hill* [2008] EWCA Civ 1211. (It might be appropriate to add *Dickins v O2 Plc* [2008] EWCA Civ 1144 to that list.) I propose to deal with each relatively briefly because I do not see it as appropriate for me to express a view as to where each leads save to determine whether the perception I referred to in the first sentence of this paragraph is valid.
232. *Novartis* concerned the question of whether the judge at first instance was justified in reaching the conclusion that the claimant's carcinoma of the bladder had been caused by his wrongful exposure to carcinogens during his employment. A central issue was the extent to which the claimant's smoking habit did contribute to, or may have contributed to, or caused the cancer. The Court of Appeal held that the judge had been so justified. In the course of her judgment (with which Sir Mark Potter P and Sedley LJ agreed), Smith LJ said this:

“It seems to me that Mr Feeny's argument raises, in a theoretical way, a particularly difficult aspect of the law on causation. In my view, the law on causation is uncertain in a number of respects. For example, does the principle in *Bonnington* apply only to 'divisible' conditions, where the various exposures contribute to the severity of the disease or does it also apply to cases in which the various exposures contribute only to the risk that the disease will develop? Another uncertainty is the extent of the mesothelioma exception. It is not limited to mesothelioma; indeed [it] has its origins in *McGhee v NCB* [1973] 1 WLR 1. In *Gregg v Scott*, the House of Lords held that it did not extend to a case in which the negligence of a doctor (in failing timeously to diagnose the claimant's cancer) had increased the risk that the claimant would die prematurely but the increase was not such as to make it probable that that would be so. In *Barker v Corus (UK)PLC*

[2006] UKHL 20, Lord Hoffman reviewed the opinions of each member of the Appellate Committee in *Fairchild* and concluded at paragraph 24:

“It is an essential condition for the operation of the exception that the impossibility of proving that the defendant caused the damage arises out of the existence of another potential causative agent which operated in the same way. It may have been different in some causally irrelevant respect ... but the mechanism must have been the same. So, for example, I do not think that the exception applies when the claimant suffers lung cancer which may have been caused by exposure to asbestos or some other carcinogenic matter but may also have been caused by smoking and it cannot be proved which is more likely to have been the causative agent”

Although Lord Hoffman was there saying that the exception would not apply where one causative agent was occupational and the other was smoking, he plainly had in mind that the two agents would act on the body in a different way. In the present case, the evidence was that the amines in cigarette smoke act on the body in the same way as the amines in the occupational exposure. It seems to me that it is highly arguable that the mesothelioma exception should apply to bladder cancer and that it would be sufficient if a claimant were to prove that the occupational exposure had made a material contribution to the risk of him developing the disease.”

233. The argument to which Smith LJ was there referring was the argument that the only circumstances in which it was possible for a claimant to prove causation merely by showing that the defendant’s breach of duty had increased the risk that he would develop the disease were those which arose in cases of mesothelioma, as explained in *Fairchild*, and that it had not been suggested that bladder cancer was analogous to mesothelioma.
234. It may be that the Defendant’s legal team is correct to describe these observations as *obiter*, but they represent, if I may say so with respect, the collective view of the court, not merely the view of one member. To my mind, they do evidence the perception I referred to in paragraph 231.
235. *Bailey v Ministry of Defence* represented the decision of the Court of Appeal dismissing an appeal from a decision of mine at first instance. Whether for forensic reasons or based upon a true conviction that it is a case that assists him is not for me to determine, but Mr Browne placed *Bailey* somewhat near the top of the list of cases upon which he seeks to place reliance. Equally flatteringly, Mr Gibson submitted that it assisted his argument. It is a case that has occasioned academic comment. Mr Gibson drew my attention to an article by Sarah Green in (2009) 125 LQR 44 entitled “Contributing to the Risk of Confusion? Causation in the Court of Appeal.” Whilst preparing this judgment I have noted and read with interest articles by Gemma Turton in ‘Medical Law Review’ 2009, 17(1), 140-147 and by James Lee in ‘Professional Negligence’ 2008, 24(3), 194-198. It would, I think, be invidious of me to make any

observations other than to say that plainly the decision of the Court of Appeal (Waller, Sedley and Smith LJJ) must represent the authoritative enunciation of the legal principle to be derived from the case. For my part, I would not have seen the case as involving an extension of the *Fairchild* exception and I am not convinced that, properly analysed, the decision of the Court of Appeal was intended to, or did, create any such extension. As Mr Lee said in his article, it was a case where there was an indivisible injury (brain damage) arising from a general state of weakness caused by the material contribution of two separate cumulative causes, one of which was induced by negligence, the other of which was not. If that is the correct analysis, then all that is to be deduced from the case for present purposes is that the dividing line between a divisible and indivisible injury cannot always be that easy to determine (as was said in *Barker v Corus*: see paragraph 227 above) and, accordingly, that it is unwise to consider striking out a case raising these potentially difficult issues until the facts have been found. At all events, if I am wrong about this and the decision should be seen as some widening of the causation boundaries, then it reinforces the perception to which I referred above. (*Dickins v O2 Plc* was a case in which a different division of the Court of Appeal, albeit one of which Sedley and Smith LJJ were members, considered the consequences of *Bailey* in the particular context of that case.)

236. *Sanderson v Hill* was a case where the judge at first instance had been persuaded that the case fell within the *Fairchild* exception. In the judgment of Smith LJ (with which Tuckey and Scott Baker LJJ agreed), her Ladyship said that “great caution is required before any development of the *Fairchild* exception should be allowed.” In that case the Court of Appeal held the facts did not justify the conclusion that the case came within the exception. I am not sure, in those circumstances, that Mr Browne can gain much help from the decision other, perhaps, than to say that a first instance judge appears to be entitled to consider whether the exception does apply in a case other than mesothelioma, but only against the background of a strict application of the conditions for applicability spelt out by the House of Lords in *Fairchild* (the approach of Lord Rodger of Earlsferry being modified in accordance with what he said in *Barker v Corus* at paragraph 97).
237. In my view, these cases do lend support to the very general proposition that the consequences of *Fairchild* are being worked through by the courts and that consideration is being given to the cautious “analogical and incremental development” of the principle therein stated. Whilst my reason for not striking out the cases at this stage is as I have previously indicated (paragraph 230), I would have been inclined to say that this analysis of the cases to which I have referred would afford another ground for taking this view.

(iii) concluding remarks on strike out

238. As will be apparent, I am unpersuaded that it is appropriate to strike out any of the claims as being “doomed to fail”. I am, however, alive to what I perceive to be the concern of the Defendant, namely, that having got over the limitation hurdle (if that is the eventual outcome of these proceedings), the situation may arise when some of the individual claims have to be discontinued because, when the evidence is complete, the view is taken by those advising the relevant individuals that causation cannot be established. In other words, in a slightly different context, the history in the *Pearce* case (see paragraphs 326-338) is repeated.

239. The case of the late Mr Sinfield is cited as an example. Mr Gibson submits that this case has been chosen by the Claimants because it “appears to the Claimants to be strong on limitation”, but is, Mr Gibson contends, on the Claimants’ own evidence plainly “not provable” on causation. He asserts that it is plain that non-Hodgkin’s lymphoma cannot be proved to have been caused by ionising radiation, either at a general or an individual level.
240. I deal with that specific case later (see paragraphs 851-866), but I can see the argument that when a Lead Case gets over the limitation hurdle, either because the relevant “knowledge” was not acquired until within 3 years of the issue of proceedings or because there is a favourable exercise of the section 33 discretion, and then it is abandoned subsequently because of difficulties of proof of causation, this might operate as an injustice to the Defendant either in relation to costs or on a wider basis.
241. I will, if invited by the Defendant to do so, consider further whether the provisions of CPR Part 38 do or do not afford adequate protection against the consequences of an event or events of this kind. If I am persuaded that they do not, I would be prepared to entertain submissions on how the Court might retain some control over the situation between now and when any trial takes place to ensure that the Defendant is not prejudiced.

15. Some broad areas of the evidence

242. Having thus decided that it is not appropriate to strike out any of the claims, I shall need to turn to the essential limitation issues, namely, when the Claimant in each of the Lead Cases had relevant “knowledge” and, if it was at a time that causes the claim to be statute-barred, whether the discretion under section 33 should be exercised in his or her favour.
243. There, are, however some broad and significant areas of the evidence and argument that have been characterised as “generic” in the case that I need to reflect upon generally because they, or at least some of them, may inform either or both of the foregoing limitation issues in the individual cases. Indeed a number of these matters go to the history of events since the 1950s which also is of importance in evaluating those issues.
244. I would enumerate those areas as follows:
- (i) What was in the public domain about the effects of ionising radiation?
 - (ii) The role of the British Nuclear Test Veterans Association (BNTVA).
 - (iii) The *Pearce* case.
 - (iv) The funding issues.
 - (v) The National Radiological Protection Board (NRPB) reports.
 - (vi) Monitoring.

(vii) The essential position taken by successive Governments over the years.

(viii) The Australian Royal Commission.

(ix) The Rowland Report.

(i) What was in the public domain about the effects of radiation?

245. The Defendant has asserted that there has been a welter of publicity over the years that should have put those who were present near the nuclear tests, or who played a part in their aftermath, on notice of a possible link to any illness, particularly cancerous, which they developed. The Treasury Solicitor commissioned a search of the available archives for newspaper articles relevant to the issues in this case (for example, radiation-linked injuries, veterans' claims, scientific reports and media coverage) since the tests. The result was to discover about 600 articles in all which fill 6 lever arch files in the material before the Court. That 'headline' statistic is, of course, not to be ignored, but as with every headline the subtext needs consideration to reach an informed view.
246. Mr Gibson, very sensibly in my view, took a pragmatic view on behalf of the Defendant and said that "in most of the [Lead] Cases ... the key period is 1980s to 1990s". Whilst this did not quite amount to a complete concession that matters going back before then were irrelevant, my view is that it would have been unrealistic to have contended that there was a sufficiently widespread "general knowledge" of the link between exposure to ionising radiation and certain illnesses or physical conditions before then for the Defendant to be able to contend realistically for a "constructive knowledge" of such matters.
247. Given the position taken by Mr Gibson, it is unnecessary for me to analyse all the material to which attention had been drawn in Mr Crossley's Generic Witness Statement. I will, however, indicate (by reference to a few articles) why, in my view, the position taken was sensible and why I have concluded as I have in paragraph 246 above.
248. For this purpose I will leave aside any article in a medical journal to which ordinary members of the public are unlikely to have had access. The following is a selection of articles that appeared in the press in the periods shown.

1956-60

249. *The Guardian* on 13 June 1956 carried a front-page article entitled "Warning on H-Bomb Tests – Long-Term Risks if Rate of Firing Continues – THE STRONTIUM DANGER". It was reporting the result of an inquiry carried out by the Medical Research Council entitled "The hazards to man of nuclear and allied radiation" (Cmnd. 9780) said in the article to have been commissioned the previous year by Sir Winston Churchill because of "public unrest about the genetic effects of the nuclear explosions carried out by the Americans in the Pacific." This plainly referred to the Bikini Atoll test referred to in paragraphs 26 and 27 above. The Defendant draws attention to the following paragraph in the article:

“There are certain constituents of fall-out, of which strontium 90 is the most important, which retain their radio-activity for long periods, and which are deposited on the ground over a very wide area where they may contaminate drinking water and crops. If strontium 90 enters the body it concentrates in bone and may cause cancer.”

250. I should, perhaps, observe that the full report of the Medical Research Council ran to 128 pages, including Appendices, and drew certain conclusions. In fact, as a report, it gives the appearance of being thorough and, so far as possible, well-informed. It certainly gives some clues as to the effect upon health that exposure to ionising radiation may have. I doubt, however, that it gained a wide circulation in its own right. For those who read it, some of its conclusions were tentative. I would merely highlight what was said in relation to fall-out from test explosions of nuclear weapons in paragraph 4 of the recommendations:

“(a) The present and foreseeable hazards from *external* radiation due to fall-out from the test explosions of nuclear weapons, fired at the present rate and in the present proportion of the different kinds, are negligible.

(b) Account must be taken, however, of the *internal* radiation from the radioactive strontium which is beginning to accumulate in bone. At its present level, no detectable increase in the incidence of ill-effects is to be expected. Nevertheless, recognising all the inadequacy of our present knowledge, we cannot ignore the possibility that, if the rate of firing increases and particularly if greater numbers of thermonuclear weapons are used, we could within the lifetime of some now living, be approaching levels at which ill-effects might be produced in a small number of the population.”

251. Returning to the article itself, it would be difficult to believe that this would have been the only article in the national press at the time on the issue of fall-out, but there is no evidence before me of any further coverage. On its face the article would not necessarily take the knowledge of someone who was present at the British tests very much further. It apparently dealt with concerns arising from fall-out from the American tests in the Pacific and, as the headline from *The Guardian* article indicated, referred specifically to the danger of Strontium-90. There was no reference to Plutonium, Polonium or Uranium. At all events, I do not think that one part of one paragraph in the middle of a fairly dense article can really be said to be evidence that demonstrates a general public awareness of the long-term effects of fall-out such that someone who was at or involved in the British tests should have attached significance to it. Equally, though it does not, strictly speaking, arise as a consequence of the evidence concerning the article, as I have already indicated, I do not think that anyone who read the report itself would have been given a significantly greater appreciation. In paragraph 14 of the Introduction the following is recorded:

“It will be evident to any reader of this report that, at the present time, there are many large and serious gaps in our knowledge of the medical and biological effects of ionising

radiation. If the potentialities for good are to be exploited with competence and safety, it is necessary that these gaps should be filled. Much research on many broad fronts will be required. Given the necessary facilities, there is no reason to doubt that the information can be obtained; and we attach the greatest importance to the recommendations for future work that we have been invited to submit for the consideration of the Medical Research Council.”

252. Attention was then drawn to three articles in 1957, one in *The Times* and the other two in *The Observer*, and one further article in 1958 in *The Guardian* containing reference to the broad proposition that there is no threshold of radiation below which there is no risk of leukaemia. This could hardly be said to have been the level of coverage of an issue that would have resonated with a reasonable person who had been present at the tests, particularly since most, if not all, of those present would reasonably have thought that the arrangements at the time of the tests protected them from exposure to radiation.

1960 - 1980

253. The reality during the 60s and 70s was that there were intermittent articles in various newspapers about the link between ionising radiation and cancer, but nothing like the kind of coverage that would give rise to a widespread appreciation of the issue.

1980 onwards

254. It was not until the early 80s onwards that media coverage gained substantial momentum. Even then it was sporadic. I can deal with it adequately by reference to tracing the history of the BNTVA which came to be formed during the early 80s.

(ii) The British Nuclear Test Veterans' Association (BNTVA)

255. Because of its involvement in the process of bringing into public awareness the concerns of test veterans and raising general awareness of issues concerning the tests and the alleged health consequences, I should say something about the British Nuclear Test Veterans' Association. I should, however, emphasise that this trial is not a trial between the BNTVA and the Ministry of Defence: it is a group action in the nature I have described previously. I have been told that out of the total number of Claimants in this action (1011), only 268 have been members of the BNTVA and for many of them, their membership was of short duration and precipitated by the discovery of a fatal illness.
256. The relevance of membership of the BNTVA in the limitation argument goes to the question of “knowledge” and I will have to deal with that, both generally and in relation to the individual cases. Mr Browne has drawn my attention to the fact that the individuals chosen by the Defendant for each of its 5 Lead Cases have all been members of the BNTVA. He says that Mr McGinley was the moving force of the BNTVA for its first 17 years, was a tireless campaigner for the cause and has devoted much of his life to pursuing that cause. Mr Dickson was apparently one of Mr McGinley's principal lieutenants (at least for a time) and he too devoted much time and energy to the BNTVA cause. Mr Noone became a peace campaigner who from

the early 1980s was suggesting that his symptoms might be causally related to his presence at the tests. He was a member of BNTVA and again sought publicity for the cause. Mr Ogden was one of the very early pension applicants and was a long-standing member of the BNTVA. Mr Clark was a member of the BNTVA from 1991 to his death in September 1992. The net effect is that, whilst only about 25% of the Claimants in the group action are or have been members of the BNTVA, because of the choices thus made 50% of the Lead Cases are or have been BNTVA members.

257. I would, perhaps, add also that it is self-evident from the numbers who have, over the years, been recorded as members of the BNTVA, that not all nuclear test veterans have been members of the Association. To that extent it cannot be said (nor has it ever been claimed, so far as I understand it) that the BNTVA represents the interests of all 20,000 or so who attended, or had some dealings with the aftermath of, the tests. Indeed there is evidence of two other organisations that were formed with similar objectives in mind, the BAVA (British Atomic Veterans' Association) being one (see paragraph 305).
258. The BNTVA was constituted formally in May 1983, but its conception was to be found in events of the previous year. The precise sequence of events is not wholly clear to me, but it appears that Mr McGinley became aware in the early 80s that others who lived in the area where he lived who had also been to Christmas Island had suffered a number of medical problems. One problem suffered by some was, like Mr McGinley himself, infertility. He had also learned of someone who then had moved to Canada, but who was present at the tests, who had suffered a similar series of problems to those suffered by him. This led him to write a letter to *The Daily Record*, published in Glasgow, in which he asked the question whether "any readers had suffered medical problems after they had returned from Christmas Island." The newspaper ran an article about Mr McGinley on 24 November 1982 and he was also interviewed on BBC Radio Scotland.
259. A question about the effect of the nuclear tests had been asked in Parliament (in the House of Lords) a month or so before the events in Scotland. Lord Jenkins of Putney asked the Government whether it was "aware that it is claimed that servicemen involved in British H-Bomb tests at Christmas Island in 1957 have suffered ill effects and whether [it] will investigate this." The Minister of State for Defence Procurement, Viscount Trenchard, said that whilst the Government was "aware of a few claims, the radiation records for personnel involved ... indicate that none suffered exposure in excess of the internationally recognised limits at the time and none should therefore face significant health risks as a result of these tests". That answer reflected the general position of various Governments over the years (see paragraphs 388-391).
260. It would seem, therefore, that the issue was coming to the surface and gathering some momentum before the brief episode in Scotland generated a considerable amount of interest and some responses from others who had been to Christmas Island. The story must have generated some rapid interest because the BBC Nationwide programme ran a story about it on 2 December 1982, less than 10 days after the article in *The Daily Record*. That programme itself generated interest and a large number of those who had been at Christmas Island who felt that they had suffered in consequence made themselves known to Mr McGinley. It was this process, that seems to have occurred within a very short space of time, that led to the formal formation of the BNTVA

about six months later, although it is plain that there had been significant moves in that direction before May 1983.

261. The objects of the BNTVA were set out in the initial constitution, the relevant paragraph of which read as follows:

“The Association is established for the relief of persons suffering from disability attributed to the effects of exposure to radioactivity particularly dealing with nuclear weapons tests, and their families and other persons suffering from similar disabilities, with a view to obtaining legal medical education, and other charitable aid, and advice to enable such persons to overcome their special differences, to live as normal a life as possible. To conduct or promote research into the causes, effects, and treatment of such disablement and to claim financial assistance, benefits and compensation as they may be entitled to.”

262. Returning to the events of late 1982 and early 1983, whilst I doubt that I have seen all the relevant material, there is no doubt from the press coverage to which my attention has been drawn that the Nationwide series of programmes on the issue (which had continued before Christmas by virtue of a further report in its programme on 6 December 1982) continued into the New Year and that there was also a Channel 4 programme on the question of possible exposure to radiation of men who were present at the Emu Field and Maralinga tests. On 12 January 1983 the Ministry of Defence announced that there would be a health survey of the 15,000 men then estimated to have participated in the atmospheric test programmes.
263. Questions continued to be raised during 1983 in Parliament about what the survey would involve and when and by whom it was to be conducted. In October the announcement was made that the survey would be carried out by the National Radiological Protection Board (NRPB). At that stage it was thought that the survey would involve 12,000 personnel, but by December 1983 the estimate was “about 20,000”. As I understand it, the BNTVA assisted in trying to identify those who were present at the tests and, whilst they would have wished for the survey to have been carried out by, as they would suggest, a body wholly independent of the Government, they agreed to support the survey (see further at paragraph 269 below).
264. I deal with the NRPB’s report and findings in paragraphs 352-354. The report itself did not become available until January 1988, some 5 years after the concept of the study was first announced.
265. I should, perhaps, record that one of those interviewed on one of the Nationwide programmes was the late Dr Alice Stewart, MD, FRCP, an epidemiologist from the Department of Social Medicine at Birmingham University, who had given evidence at the Windscale Public Inquiry in 1977. (Windscale was later to become Sellafield.) The Nationwide team had asked her to look at some of the cases that had come their way and in due course Mr McGinley and his colleagues were put in touch with Dr Stewart by those responsible for the Nationwide programme. Mr McGinley, plus the Nationwide team and at least one other newspaper, supplied Dr Stewart with details of a number of servicemen who had been present at the tests. Dr Stewart and two of her

colleagues from Birmingham (Professor Knox and Dr Sorahan, later Professor Sorahan) wrote to *The Lancet* on 9 April 1983 indicating, on the information put to them which was “far from complete”, that there was already “evidence of an abnormally high incidence of leukaemia and other reticuloendothelial system (RES) neoplasms.” (Neoplasm is another word for tumour – which may, of course, be benign or malignant.)

266. Before moving from this letter to continue dealing with the BNTVA, it is interesting to note the terms of a letter appearing on the same page of *The Lancet*, signed by seven distinguished signatories including Professor Joseph Rotblat (later to become Sir Joseph Rotblat, KCMG, CBE, FRS, who was awarded the Nobel Peace Prize in 1995) who had appeared in one of the Nationwide programmes (and who became something of an adviser to the BNTVA), which suggested that the “reported incidence of cataract ... is a strong indication that some of those involved had received radiation greatly in excess of a safe dose.” The letter contained the following paragraph:

“The servicemen present at the nuclear test explosions constitute a uniquely large sample of healthy young men who were at risk of exposure to ionising radiation and among whom there now appears to be evidence of radiation related effects. To examine as fully as possible their subsequent medical histories, access to a complete nominal roll of the total group of exposed persons is required, together with full disclosure of what is known about radiation exposure for men on duty during these tests. We urge that an independent academic body be asked to conduct a full investigation into the morbidity, mortality, and perhaps genetic effects in these men, and given the means to do so.”

267. I have not seen any Minutes of BNTVA committee or general meetings before 25 February 1984, but it is plain that the Association was “up and running” in a very active way by then, including having representatives in most areas of the country. Mr Mark Mildred, then a solicitor with Messrs Pannones, acted as solicitor to the Association. At the meeting in February 1984 there was discussion of possible test cases for the court, Mr Pearce’s name (see paragraphs 326-338) being recorded as one potential candidate. In March of that year the committee met a number of MPs at the House of Commons and the meeting was addressed by a representative of the USA Veterans Organisation.
268. There was reference in the minutes of the meeting of February 1984 to a newsletter, but I do not think that regular newsletters started until the spring of 1989. From then onwards, those who were members of the BNTVA would have received three or four newsletters a year keeping them abreast of developments. It is, perhaps, to be borne in mind that the formation of the BNTVA was, of course, well before the Internet became a familiar part of everyone’s lives – indeed some years before even fax machines were first regularly part of a professional person’s life. (I note from the Minutes of a meeting of the BNTVA on 27 April 1990 that it was felt that fax machines were too expensive to acquire at the time.) It follows that there was no website to which access could be gained at this time and communications were generally in the sporadic form of contact largely by post - probably well into the 1990s and possibly a little beyond.

269. From the time the NRPB was invited to conduct the health survey to which I have referred until the time it reported (in January 1988), there was only a limited amount that the BNTVA (or indeed anyone) could have done realistically to secure compensation in the form of a claim for personal injuries on behalf of the veterans. It should be noted, and it may be of significance, that Mr Mildred had told the Committee of the Association at a meeting in November 1985 that unless the Association co-operated with the NRPB they did not “have much of a chance of getting anywhere.” He said that “scientifically there wasn’t enough radiation to affect anyone” and that on the basis of the UK figures “the average dose was $\frac{1}{3}$ of a rem so [that the] chances of cancer were so low they would be zero.” (Since 1 rem is 10 mSv, $\frac{1}{3}$ of a rem would be 3.33 mSv.) Mr Mildred emphasised the need to “get over the hurdle of the NRPB first as he didn’t know how else to go about things.” This advice was accepted. (In respect of legal advice recorded in the minutes of the BNTVA meetings and its newsletters, it is accepted that privilege has been waived for the purposes of the limitation proceedings.)
270. However, during the period whilst the NRPB report was awaited the case of *Pearce* (in which the proceedings were issued on 7 June 1985) was pursued through the courts which ended with the House of Lords agreeing with the courts below that the Ministry of Defence could not rely upon section 10 of the Crown Proceedings Act 1947 to suggest that a veteran could not bring a claim in negligence: see *Pearce v Ministry of Defence* [1988] AC 755. The decision of the House of Lords was given on 28 April 1988. I deal with the implications of this case in paragraphs 326-338.
271. That decision in *Pearce* was given a few days before the AGM of the BNTVA held in Blackpool and Mr Mildred is recorded as saying that the next step (presumably after having disposed of the section 10 issue) was “to prove the MOD did not take enough precautions to ensure servicemen were safe ... [and] that negligence was the cause of [the] illnesses ...”. He was recorded as having been very critical of the NRPB study published in the January of that year (which I deal with in paragraphs 352-354), but was also recorded as being of the view that there was a “good chance of a case of leukaemia or multiple myeloma winning in the courts” (a view which, incidentally, appears to be shared at the present time by Professor Kaldor if the Claimant could be shown to have been exposed to 200 mSv or more of ionising radiation). The next test case, he said, had to be picked very carefully.
272. It is tolerably clear from the advice Mr Mildred is recorded as having given that his view was that causation of injury would not present an insuperable problem in relation to someone who was present at the tests and who went on to develop leukaemia or multiple myeloma. At that stage the causation case would have been presented on the basis of epidemiological evidence of the NRPB alone, though it does have to be observed, apart from in a relatively few cases, no exposure to ionising radiation beyond the normal was conceded on behalf of the Ministry of Defence and those present at the tests would probably have had considerable difficulty in proving it.
273. As I have indicated, the NRPB study was published in early 1988, nearly five years after the initial publicity given to the possible health issues arising from presence at the tests: see paragraph 262. There can be little doubt that this general period represented a time when the BNTVA, and the general issue of the health consequences of presence at the tests, gained an increased public profile. Anyone

who joined the BNTVA or who had read a newspaper report (or had seen a piece on television) would, if not before, have been alerted to the issue. The consequences of that for limitation purposes is a matter to which I will return: see paragraphs 294 and 324.

274. In the meantime the BNTVA, through Mr McGinley and Mr Mildred, had made representations to the Royal Commission into British Nuclear Tests in Australia (the ‘McClelland Commission’) on behalf of the BNTVA. I do not have the precise dates upon which they took part, but the Commission, which started its work in 1984 and presented its report in November 1985, took evidence in the United Kingdom in January and February of that year. It appears from material in the papers before me that the final submissions of all parties were heard in Australia in September 1985.
275. I say more about the work of the Commission and its potential relevance to the limitation issue in paragraphs 392-400, but it is to be noted that the BNTVA was, within two years or so of its formation, playing an active part in a high profile inquiry. The submissions made by the BNTVA were referred to in an article in *The Guardian* on 18 September 1985 and the Association was referred to again in *The Guardian* and *The Observer* in December 1985.
276. During this general period Mr McGinley wrote to many leading MPs. During 1986 he asked for a commitment by each of the three main political parties that there would be “a full and open judicial inquiry into the current health of each British ex-serviceman and civilian who was involved in” the tests in Australia and the Pacific. Mr Norman Lamont MP, then Minister of State for Defence Procurement, said in a letter dated 6 May 1986 that he was “prepared to consider other forms of enquiry (on the health of the veterans) but it would be inappropriate to embark on any while the ... NRPB study was in train”. Mr McGinley received a letter from Mr Neil Kinnock MP, then leader of the Labour Party, dated 22 May 1986 in the following terms: “The next Labour Government, as a matter of urgency and priority, will set up a full judicial inquiry on the lines set out in your letter and we will also consult with your Association on the terms of reference of the inquiry.” Mr David Steel MP gave the assurance he sought in a letter dated 1 May 1986. I record these matters merely to indicate that the Association had plainly made its presence felt in circles such as these by this time.
277. Before moving on chronologically in the history of the BNTVA, it is to be noted that whilst the focus of the present case is upon claims for compensation, the Association had always put at the forefront of its campaign the issue of pensions. Whilst I have not seen much of the early material that the Association sent out, there is no doubt that by no later than 1989 it was actively telling its members to apply for a pension in appropriate circumstances. The advice about this probably came from Mr Mildred (who is recorded as giving advice about this at the meeting in May 1988 to which I referred above). The first newsletter in 1989 (see paragraph 268 above) encouraged anyone who was, or believed they were, suffering from leukaemia or multiple myeloma to apply for a War Service pension because they were then “the only officially recognised radiation linked diseases”. It was, however, suggested that in respect of anyone who believed they were suffering from “some other disability you or your GP believe may be linked to service during the tests and especially if you are suffering from” diabetes, a heart complaint following an amputation or “eye trouble” it might be worth claiming a pension “even if you are turned down (which will

probably happen) because if things change in the future ... the pension will be backdated to the date of your first claim.” (My emphasis.) The relationship of the pension claims to a possible compensation claim was expressed in this way:

“You should also claim even if you think you ought to get compensation. One reason for this is that for a pension you only need to show a reasonable possibility that your health was damaged during the Tests, but for compensation, as things stand, you have to prove negligence, which is a different ball game.

Even if you feel you may one day get compensation, you should still go ahead and claim a pension, and not ask for it to be deferred. Compensation still has a long way to go, and if and when it happens there may have to be cash adjustments to allow for any pension you may then have; but all this is in the future, the best advice is to go ahead with a pension claim anyway.”

There was general encouragement to a widow to make a claim in appropriate circumstances.

278. I will pause in this review of the BNTVA history to indicate briefly the nature of the War Pension scheme. It is effectively a “no fault” scheme to provide a pension where a veteran with an illness can raise a “reasonable doubt” as to its attributability to his service. The veteran must show that he was present at a UK nuclear test and produce evidence that raises a “reasonable doubt” of radiation exposure during his service and then demonstrate a “recognized causal link” between the illness and the exposure. Very few applications were successful even given the apparently low threshold of proof, a typical rejection being exemplified by the rejection in the late Mr Clark’s case (see paragraph 733).
279. The policy of encouraging pension applications was, as I say, in operation by early 1989. Although earlier letters and questionnaires from the Association to potential members do not survive, an example of what was being sent out in 1991 does. Mr McGinley accepted that the Association had been seeking details about people’s illnesses before that, but the information sought by now was probably more detailed than before. The 1991 version (which is the version filled in by the late Mr Clark: see paragraph 733 below) asked for details of the tests witnessed, how far the individual was from the blast(s), whether he was involved in any clean up operations and details of protective clothing and so on. In relation to health issues each person was asked whether, when he returned from service, he developed “any illnesses which [he] had not suffered before” and if so identifying them. The recipient of the questionnaire was asked to indicate with a tick against a list of conditions and illnesses whether they had been experienced since returning from the tests. It was an extensive list detailing skin complaints, blood conditions (including leukaemia) and “effects on tissue” which included malignant tumours of bones, lungs or other tissues. The list also included a series of other matters including sterility, deafness, cataracts and persistent diarrhoea. The questionnaire at this stage also asked whether there had been any miscarriages or stillbirths experienced and also for details of any health issues with children and grandchildren.

280. During 1990 Mr Bob Clay MP put forward a Private Member's Bill entitled the Radiation Exposed Crown Employees (Benefits) Bill in support of the BNTVA cause. It was defeated by 276 votes to 218 on 29 March 1990, but enabled the BNTVA to claim the support of "over 200 MPs of all Parties fighting our case in the House of Commons".
281. From early 1990 it became known that a former RAF serviceman, Mr John Hall, who had worked on the Active Handling Flight (AHF) with 76 Squadron cloud-sampling Canberras, who had contracted hairy cell leukaemia, was to bring a test case in the High Court. It was reported in *The Independent*. Mr Hall's case was taken up by his MP, Mr Keith Vaz, who asked the then Prime Minister, Mr John Major, to reflect on the case of John Hall and asking if he would "reverse the Government's policy and in compassion, humanity and justice, provide John Hall and the other nuclear test veterans with the compensation that the House and the country believe that they so richly deserve?" The Prime Minister said that he would examine the case. This was reported in *The Independent* on 5 December 1990 and *The Daily Telegraph* on 7 December 1990.
282. 1991 started on a high profile note for the BNTVA. Channel 4 ran a Dispatches programme (for which Mr Eamon O'Neill was the researcher) entitled "The Truth about Christmas Island". Mr McGinley figured in the programme and indeed travelled back to Christmas Island to revisit areas that he recalled. Reference was made to the BNTVA during the programme. The programme received some national press coverage, notably in *The Sunday Express* and *The Guardian*.
283. During 1991 Mr McGinley's book "No Risk Involved" was published (see paragraph 683).
284. In 1991 Mr Mildred also gave some further advice to the Association at its Annual General Meeting in April. He is recorded as saying that it was very difficult to prove negligence and consequently win compensation. He advised them that they had to prove two things, firstly, that the Ministry of Defence was negligent in its conduct of the tests and, secondly, that it was their negligence that caused, directly, contamination leading to whatever illness may be claimed. He is reported as saying that this would be difficult because at the time of the tests, according to documents released to him, negligence did not occur. He had, apparently, spoken with Professor Ted Radford, who was a retired US health physicist, who had stated that the tests met with the requirements of the day. However, he was reported as saying that once the next NRPB report was released the following year, the Association would be in a better position to know how it stood. The second NRPB report is dealt with in paragraphs 355-360.
285. The previous day, at the Executive Committee meeting, Mr Mildred is recorded as having told the meeting that he had met Professor Radford, who had read through the documents released to him by the Government (in the *Pearce* litigation) and had told him (Mr Mildred) that the tests were set up in accordance with the standards of the day and that the precautions and dose limits were acceptable for that time. To that extent there was no negligence. Mr Mildred is recorded as having agreed with Professor Radford's findings. He is, however, recorded as saying this:

“We cannot work on today’s knowledge, only what was known at the time of the tests. We cannot prove negligence. Our best bet is to carry on pushing for pensions and keep up the pressure on the Government and the MOD. If we can prove someone received a dose above the safety level – that would be negligence.”

(My emphasis.)

286. In July 1991 Mr. Pearce discontinued the claim he had brought (presumably on Mr Mildred’s advice). The reason appears to be that the expert advice he received was that he could not establish that he had received sufficient exposure to ionising radiation for the causal link to be established. Professor Radford apparently advised in these terms:

“Mr. Pearce’s lymphoma is a type of cancer that is known to be produced by radiation exposure, although it is not as commonly observed in excess from such exposure as some other types of cancer. Moreover the onset of this cancer 20 years after his service on Christmas Island would be consistent with the timing of a cancer resulting from radiation exposure. Nevertheless because there is so little indication that Mr. Pearce received a radiation dose that could have affected significantly his probability of developing lymphoma, I do not believe that there is a medical basis for connecting his cancer with radiation received during his stay on Christmas Island.”

287. In 1992 two reports were prepared under the auspices of the BNTVA. The first, dated 29 February 1992, and prepared by Mr John Urquhart, an epidemiologist, was in response to the findings of the NRPB and entitled “Radiation Exposure and Subsequent Health History of Veterans and their Children”. This report was relied upon in the application made the following year to the European Commission of Human Rights. The next was entitled “A Very Clean Bomb? A Study for the British Nuclear Test Veterans Association (North East)” dated July 1992, prepared by Ms Danuta O’Neill. It concluded that the evidence “has now established, beyond reasonable doubt, the profound harm caused and inflicted on, not only the test veterans, but also, their wives and countless generations of children who will continue to pay for the atomic weapons trials with their lives”.
288. On several occasions during 1992 until Mr Hall’s death in June, Mr Vaz raised his case in the House of Commons. On 9 June there was a debate on the whole issue and Mr Hall’s case was mentioned as was the BNTVA. Mr Hall’s death was reported in *The People*.
289. As I have indicated, the second NRPB report had been anticipated during 1992, but in fact did not become available until December 1993. I deal with its impact elsewhere (paragraph 359), but it generated some publicity. Under the headline ‘Servicemen in A-tests not at undue risk of cancer’, *The Guardian* carried a report on 9 December 1993 carrying the message that “British servicemen who took part in atomic bomb tests more than 30 years ago will learn today that there is no evidence of a higher than usual incidence of cancer in their ranks.” *The Independent* on 10 December carried a

headline of ‘Bomb tests gave no extra cancer risk: Former servicemen angry over delivery of results of 10-year study that dashes hope for compensation’ and a report that veterans had walked out of a scientific briefing in protest at, as they saw it, of selective “leaking” of the findings to the media. It appears that the NRPB understood the reason for the BNTVA “walk-out” because it too felt that the pre-arranged embargo had indeed been breached.

290. The purpose of recording this is simply to demonstrate the role that the BNTVA was playing at this stage and also to show that the “message” that would have been conveyed to any interested reader would plainly have been that no increased cancer risk had been demonstrated in relation to those present at the tests.
291. It is, perhaps, worth noting at this point that the Defendant argues that the publicity about the NRPB report and the payments to be made to the Australian government as agreed in 1993 (see paragraph 396) should mean that any veteran who felt his injury was or might be due to his service at the tests ought to have taken steps to investigate it in 1993 and “prompted any reasonable Claimant to investigate taking proceedings”. For reasons that will become apparent, I do not consider that to be a realistic suggestion.
292. Whilst dealing with 1993, it should be noted that on 19 April Mr McGinley launched his application to the European Commission of Human Rights (“the Commission”). Mr Egan launched his on 31 December 1993. I deal with those applications at paragraphs 318 and 551-552.
293. A measure of the support that the BNTVA had by this time can be obtained from what was said in the supporting documentation to the Commission. It was claimed that the Association consisted of “2,800 members of which 2,165 are former British ex-servicemen, 20 are former civilian workers, 300 widows of deceased ex-servicemen and former members of the association, and 315 are genetically-impaired children of ex-servicemen and civilians”.
294. If one pauses at the point of the publication of the second NRPB report, it would certainly be a reasonable conclusion to draw that there was a fair amount of publicity and public comment between 1990 and 1993 about the tests and their alleged effect upon those present. Those who were actively involved with the BNTVA would almost certainly have been aware of it. Those less actively involved with the BNTVA and those not involved with the Association at all would have known about it if, by chance, they happened to see something about it in the media. I do not think it can fairly be said that everyone who became ill during this period and who thought there was some possible connection with the tests must be held to have all the knowledge that active members of the Association had.
295. Whilst only tangentially relevant to the BNTVA’s position, it is appropriate to record, because the Defendant places some reliance upon it, that in 1993 the case of *Hope & Reay v British Nuclear Fuels Limited* – reported at (1994) 5 Med LR 1 - was tried and decided. Mrs Reay brought a claim against BNFL in respect of the death of her 11-month old daughter from leukaemia and Ms Hope brought a claim in respect of her own non-Hodgkin’s lymphoma (see paragraph 327) each alleging that ionising radiation at BNFL’s Sellafield nuclear plant caused these conditions in the sense that the fathers were exposed to radiation in their work at Sellafield and that ‘paternal pre-

conception irradiation' (PPI) caused, through paternal sperm, a pre-disposition to leukaemia and/or NHL in the next generation. The judgment of French J was given on 8 October 1993. It held that a causal connection between the PPI and each condition had not been established on the balance of probabilities.

296. The following day *The Guardian* carried a report under the headline "Court rejects cancer link" saying that the families of former Sellafield workers had lost their case "to prove radiation damaged sperm and led to leukaemia in children up to 40 years ago."
297. For my part, whilst it is true that this case (and any publicity arising from it) would have raised the profile of the possible link between ionising radiation and cancer in the next generation, I am not sure that it would have conveyed anything positive about the connection to anyone who read about it: indeed quite the reverse.
298. At all events, so far as the continuing activities of the BNTVA after the end of 1993 are concerned, they were perhaps slightly less high profile, though no less active, for the next few years than had been the case in the early 80s and again in the early 90s.
299. I can, without doing injustice to either party, move forward in the BNTVA's activities to 1997, save to note that in 1996 they raised concerns with the NRPB about the possible destruction of the nuclear veterans' database, concerns which, it appears, were misplaced. They had also engaged with the NRPB over the Phelps-Brown survey to which I refer in paragraph 371. In 1996 Mr McGinley also had what may have turned out to be a somewhat short-term victory in the European Commission of Human Rights to which I refer in paragraphs 552-553.
300. By 1997 Dr Sue Rabbitt Roff (Ms Susanne Roff, PhD, of the Centre for Medical Education at Dundee University Medical School) had become Research Adviser to the BNTVA. She was the Cookson Senior Research Fellow at Dundee University, a position, as I understand it, funded by the late Dame Catherine Cookson following an approach by Mrs Sheila Gray, the Secretary of the BNTVA. Dr Rabbitt Roff, who grew up in Australia, has described herself as having "represented human rights organisations at the United Nations in New York throughout the 1980s, with particular reference to peace and security issues in small states and territories." From 1991 she had taught Social Sciences and Medical Sociology at Dundee University Medical School, one of the courses dealing with the health hazards of ionising radiation. She had published a number of books including, in 1995, "Hotspots: The Legacy of Hiroshima and Nagasaki".
301. From about 1995 she had been assisting veterans (presumably through the BNTVA) with applications to The War Pensions Agency. As a result of that collaboration the BNTVA commissioned a health study of BNTVA members and their families to be undertaken by Dr Rabbitt Roff. A detailed questionnaire was prepared by Dr Rabbitt Roff and sent to all members of the Association in December 1997. A little earlier in the year, in July, with the assistance of information provided to her by the Association, Dr Rabbitt Roff began a study of the causes of death of the members of the Association of whose death notification had been received by the Association between 1983 and July 1997. Although the results of these two separate surveys became public earlier, they were published in "Medicine, Conflict and Survival" (Vol. 15, Supplement 1, July-September 1999) and entitled "Mortality and Morbidity of

Members of the British Nuclear Tests Veterans Association and the New Zealand Nuclear Tests Veterans Association and their Families”. I deal briefly with its conclusions in paragraphs 368-369.

302. The results of Dr Rabbitt Roff’s work did receive some publicity. On 13 December 1998 *The Mail on Sunday*, under the headline “End A-test injustice”, carried a report of the survey. On 12 January 1999 *The Daily Record*, under the headline “A-bomb test veterans in case breakthrough”, reported that Dr Rabbitt Roff “who has studied 2,500 cases during the past 18 months, found 45 nuclear veterans had died or had been diagnosed with multiple myeloma - cancer known to be caused by radioactivity.” In January both *The Guardian* and *The Lancet* carried reports that the Australian and UK Governments had announced separate inquiries into the results of her work. I deal with that at paragraphs 310-315 and 372.
303. Before moving on in time, it is also to be noted that in the period 1996-1997 the BNTVA had contact with the NRPB in relation to what became known as the ‘Phelps-Brown study’, an NRPB-funded study (in which, amongst others, Mr N.A. Phelps-Brown, Consultant Ophthalmologist, and Dr Darroudi were involved) looking at whether elevated levels of chromosome translocations could be responsible for cataracts in UK Veterans. I deal with the study in paragraphs 304-305 and 371, but it is convenient to record here the exchange of correspondence between the NRPB and the BNTVA in late 1996 and early 1997 because the Defendant places some reliance upon it (see paragraph 306).
304. In a letter to the Vice Chairman of the BNTVA, Mr Peter Fletcher, dated 17 December 1996, the Head of the NRPB’s Biomedical Effects Department, Mr Roger Cox, explained the nature of the study in these terms:

“... NRPB have been funding and co-ordinating a study on the possible relationship between the presence of eye cataracts in UK Test Veteran volunteers and the frequency of stable chromosomal aberrations (translocations) in their blood cells. The principal aim was to determine whether volunteers with posterior-subcapsular cataract (PSC), which is known to be inducible by radiation, had levels of chromosome translocations that were elevated sufficiently to suggest that unrecorded high doses of radiation were responsible for their specific eye disorder.”

305. This prompted a request by Mrs Sheila Gray (see paragraph 300), communicated to Mr Cox in a letter of 30 December 1996, for more information about the study. It appears that the study was initiated in 1994 with the blood sampling of volunteers who were recruited with the BNTVA and the BAVA (the British Atomic Veterans Association, an association set up by Mr Tom Armstrong, one of those featured in the first Nationwide programmes: see paragraphs 260 and 262). The aim of the study was described in these terms:

“The hypothesis to be tested in the study was whether the presence of posterior-subcapsular cataract in test veterans might be associated with unrecorded high doses (greater than around 1.3 Gy) of radiation. A chromosomal technique

believed to be capable of assessing, in blood cells, historical radiation doses of this magnitude was employed in the methodology.”

306. As recorded in paragraph 303, the Defendant relies upon this exchange of correspondence (plus the knowledge that would have been gained by those actively involved in the BNTVA) to show that in 1996/1997 the BNTVA and the veterans associated with it were aware of the possible association between translocations and disabilities arising from exposure to ionising radiation and the existence of technology designed to reveal the existence of the such translocations. My conclusion in relation to that is expressed at paragraphs 409-414.
307. I have been dealing with matters taking place in the broad period 1996-1999 in connection with the activities of the BNTVA. I should record also that in 1998 (on 9 June) the final results of the applications made by Mr McGinley, Mr Egan and Miss ‘LCB’ (Lorraine Burns) became known. Mr McGinley had won some support from the Commission in relation to the difficulties of obtaining documentation (see paragraph 552), but the net result of the application to the European Court of Human Rights was that the applications were dismissed. I deal with this in paragraphs 551-552, but the relevance for present purposes is in the publicity that it engendered.
308. The Defendant has drawn attention to a number of media references to these cases including articles on 10 June 1998 in *The Times* and *The Guardian* and in *The Daily Mail*, under the headline “Euro Judges dash payment hopes for A-test servicemen”. Whilst, as I say, the Defendant has drawn attention to this article (along with others), it would be difficult to see how, having read it, a veteran who knew little of what the European Court case was about would have been encouraged to pursue a case himself. The article contained a paragraph saying that “around 3,000 veterans of British nuclear tests in the Pacific yesterday had their hopes of compensation dashed” and Mr Egan was quoted as saying that he was “bitterly disappointed” by the ruling and that it was “not only the end of the road for me, but for thousands of others who were hoping this would create a precedent.” A Government minister was quoted as saying that the documents provided both before and during the proceedings demonstrated that “the great majority of servicemen present at the tests were in a safe position, too far from the nuclear detonations to receive any measurable radiation dose.” He also referred to the NRPB studies that had found no proof that veterans “suffered worse health than the general population.” This, of course, reflects the consistent position taken by successive Governments over the years: see paragraphs 388-390.
309. As will be apparent, that article would have offered no encouragement to anyone thinking of suing the Government. The reports in *The Guardian* and *The Daily Record* did, however, contain some slightly more positive suggestions from Mr McGinley and in *The Daily Record* Dr Rabbitt Roff is quoted as saying (correctly) that the European Court case was decided on “technical and procedural matters” and that her research, which was reported as “showing radiation caused a five-fold increase in blood cancers among veterans”, was not taken into account.
310. As I have already indicated (paragraph 302), the tone of the reporting changed somewhat at the beginning of 1999 when the Ministry of Defence agreed to look at the consequences of Dr Rabbitt Roff’s research. On 12 January 1999 (16 years to the day after the first health survey of veterans was announced by the Ministry of

Defence: see paragraph 262), *The Daily Record* reported that the previous day the Ministry of Defence had agreed to look again at the claims being made by the veterans in the light of Dr Rabbitt Roff's research.

311. I deal with the steps taken by the Government following this announcement in paragraph 313, but for completeness I should record what Dr Rabbitt Roff said in an article published in *The New Scientist* on 6 February 1999. After describing the studies she carried out and detailing the results, she said this:

“A few days before Christmas, John Spellar, a Junior Defence Minister, wrote to me agreeing with my findings that the rate of death from multiple myeloma has accelerated since 1990. But the Government has still not accepted that the radiation received during the tests is the cause. So I have brought together a multi-disciplinary team of researchers from the Universities of Dundee and St Andrews to establish whether or not these servicemen suffered radiation injury. We plan to make use of recently developed radiobiological tests, which work all the better the longer ago the exposure occurred. The project, we estimate, will need at least £250,000.”

312. I would merely observe, in passing, that if that estimate of the costs for study was accurate, it reinforces the conclusion I draw in paragraph 410.
313. As with the first announcement of a health survey in 1983, it took a little while for the Government to put in place arrangements for the review that had been announced in January 1999. However, on 1 September 1999, the NRPB wrote to Mr McGinley as Chairman of the BNTVA indicating that Mr Spellar had requested the NRPB “to undertake a study into the incidence of multiple myeloma in the veterans of the UK atmospheric nuclear test programme” and indicated that the study would be “subject to independent oversight by a committee including eminent academics and scientists.” The letter constituted an invitation to the BNTVA “to nominate an observer to this committee.”
314. The BNTVA did indeed appoint an observer and the role was initially taken by a Mr Mike Doyle (who attended the first meeting) and then subsequently, from during 2000, by Mrs Gray. In the March 2000 BNTVA Newsletter Mr Doyle said that he had “listened to some very constructive talking” and that “at present he [had] high hopes that this may turn out to be a very progressive study”, though he added “only time will tell”.
315. The Advisory Committee included Dr Sorahan, who had contributed to the letter to *The Lancet* in 1983 (see paragraph 265) and Professor Kaldor (a corresponding member), who had advised the Australian Government in July 1999 and who has since been instructed as an expert in this litigation on behalf of the Ministry of Defence. At the first meeting of the Advisory Group in November 1999 it was recommended that “attempts should be made to compare the two sets of multiple myeloma data held by [Dr Rabbitt Roff] and [the] NRPB”, this recommendation following on from a recommendation by Professor Kaldor to the Australian Government that there should be cross-matching of the two sets of data. This comparison exercise took place at the meeting on 14 September 2000, attended by Dr

Rabbitt Roff and Mrs Gray, as the observer on behalf of the BNTVA. (Professor Kaldor is Professor of Epidemiology in the National Centre in HIV Epidemiology & Clinical Research at the University of New South Wales.)

316. Again, the present purpose of recording this is to show the official involvement of the BNTVA at this juncture.
317. Whilst it is unnecessary to dwell upon it, there had been an unhappy AGM of the BNTVA in April 2000 which saw Mr McGinley walk out and effectively resign as Chairman. From the minutes of BNTVA meetings and BNTVA Newsletters that I have seen, there had plainly been differences between him (and others) and Mrs Gray for a number of months prior to that arising, it seems, from her involvement with Dr Rabbitt Roff and Dundee University. Indeed she had apparently been dismissed from her role as Secretary of the BNTVA at some stage during 1999. To the extent that it matters (which I do not think that it does), it appears from a letter written by Mr McGinley on 1 March 2000 that it was her involvement with Dundee University that had led to the differences. At all events, from April 2000 Mr McGinley ceased playing any active part in BNTVA affairs, although, as I understand it, he did take part in the BNTVA rally in London on 25 November 2002.
318. Prior to the meeting at which he resigned, Mr McGinley had received, on 28 January 2000, the judgment of the European Court of Human Rights on the revision request arising from the cases brought by him and Mr Egan. This had been based on the suggestion that a Mr Reid had made an application under rule 6 of the PAT (see paragraph 551) and that it had been unsuccessful. This information, it was suggested, could have made a difference to the decision of the European Court of Human Rights if it had been known. The Court, however, concluded that “while copies of the correspondence upon which the revision request was based may not have been actually obtained by the applicants until after the delivery of the original judgment on 9 June 1998, they manifestly were on notice in August 1996 of the existence of the correspondence” and, accordingly, the matters relied on “could reasonably have been known” to the applicants prior to the delivery of the original judgment.
319. During the rest of 2000 the BNTVA continued lobbying MPs and writing to people such as the Prime Minister, a process which continued into the following year.
320. Internally, it is to be noted that in September 2001 an executive committee member, Mr Derick Redfern, consulted with a number of people within the organisation to see if there was support for commencing litigation against the Ministry of Defence. In the Christmas 2001 BNTVA Newsletter there was a letter from a solicitor, Mr Peter Bright (of Messrs Clarke Willmott & Clarke), the material parts of which were in these terms:

“I am well aware that other lawyers have tried to get compensation for you and that they have failed. So why is it worth my even considering investigating your claims?”

Two matters have changed since the last attempt was made. The first is that Sue Rabbit Roff has published a further report, which takes the scientific evidence forwards significantly, and

further helpful evidence has emerged about the Ministry of Defence's attitude to the troops at the time of the tests.

The second is that the attitude of the Ministry of Defence towards claims for events which happened a long time ago seems to have softened.

Nevertheless, there would be formidable problems involved in bringing claims to court, and there is no point in playing them down."

The letter then goes on to talk about plans to apply for Legal Aid for a number of veterans who might be entitled to it in order to conduct some research, the longer term plan, apparently, being to enter into some kind of Conditional Fee Agreement.

321. This is a theme to which Mr Redfern returned in a further letter in January 2002 and by June 2002 the Chairman, Mr Lowe, was writing to all veterans and their dependants inviting them to respond to a joint letter from Messrs Clarke Willmott and Clarke and Messrs Alexander Harris, firms which were by then commencing the investigations to which I refer in paragraphs 434 and 435.
322. I do not consider it necessary to review the detail of the activities of the BNTVA after this time, although further newsletters, correspondence and media and *Hansard* reports (where reference is made to the Association) are contained in the bundles before the Court. There is no doubt at all that, as an association, it raised and then maintained the public profile of the issues arising from the nuclear tests so far as they affect, in particular, the British servicemen who were present. As one of its Newsletters records, it has had its "ups and downs" over the years, but it has certainly gone through a period of developing sophistication in communications (consistent with the overall development of electronic communications over the last 25 years or so) and has not wavered in its attempts to secure appropriate recognition and redress for its members. It is still an active organisation, though inevitably those who continue to be particularly instrumental in keeping it going are now mostly in their 70s.
323. I have reviewed the activities of the BNTVA extensively because the Defendant has focused very significantly upon its activities and has chosen only members of the BNTVA for its Lead Cases (see paragraph 256). It is suggested by the Defendant that its activities and the knowledge engendered by its activities provide a good barometer of the knowledge available to veterans as a whole.
324. In respect of those who were actively involved in the Association at any stage, then I am sure it would be right to conclude that they would have been more up-to-date than anyone else in the UK about current developments. Those who were members and on the mailing list for Newsletters could have made themselves familiar with what was happening, but it does not necessarily follow that they did. There were some individuals who would have been aware of every twist and turn, but the impression I have gained is that many individuals turned to the Association only when a combination of circumstances (perhaps a sudden illness that he or someone close to him thought might be associated with presence at the tests) impelled them to seek advice and help. As I have indicated previously (see paragraph 294), I do not think

that it can fairly be said that what those closely involved with the BNTVA knew at any stage must be imputed to the wider community of veterans. The knowledge of each individual must, in my view, be determined by reference to that individual's own position.

325. One of the cases supported by the BNTVA was the case brought by Mr Pearce to test what, for convenience, I will refer to as "the section 10 point" (see paragraph 270 above). I should say a little more about that case.

(iii) The *Pearce* case

326. Mr Melvyn Pearce was a former Lance-Corporal in the Royal Engineers who was present during Operation GRAPPLE between December 1957 and 28 October 1958 and, he claimed, witnessed nuclear explosions taking place. He also said that he ate locally-grown fruit and produce and that he swam in the sea around Christmas Island. Later in life he developed lymphoma. From the judgment of Ralph Gibson LJ in the Court of Appeal (at p. 771), the following is to be deduced concerning his health problems as they were alleged to have been:

"The nature of the injuries alleged is that in 1966, some eight years after his service on Christmas Island, the plaintiff suffered a rash which became a severe skin condition in 1970. By 1978 the plaintiff was suffering from a soft tissue tumour and lymphoma. By 1981, as a result of treatment of the plaintiff's condition, his thyroid gland had been rendered inoperative."

327. Lymphoma is cancer of the lymphatic system which is a system that comprises a series of vessels and glands, known as lymph nodes, which are distributed throughout the body. The lymphatic system is part of the body's immune system and carries lymph (a fluid full of white blood cells known as lymphocytes which fight infection) around the body. In lymphoma, lymphocytes begin reproducing in an abnormal manner and begin to collect in certain parts of the lymphatic system such as the lymphatic nodes. The affected lymphocytes begin to lose their infection-fighting properties making the body more vulnerable to infection. Traditionally, two classifications of lymphoma, Hodgkin's lymphoma and non-Hodgkin's lymphoma, are referred to although this has ceased to be a universally used distinction.
328. By writ issued on 7 June 1985 (during the period of the Royal Commission into British Nuclear Tests in Australia: see paragraph 392-400) Mr Pearce sued the Secretary of State for Defence and the Ministry of Defence jointly in negligence. As Ralph Gibson LJ put it shortly, "[all] the injuries are said to have been caused by the plaintiff being exposed to radioactive material in the course of his posting on Christmas Island." Because reliance is placed by the Defendant on the precise allegations made I will set them out in paragraph 330 below.
329. It should be noted that it was claimed that Mr Pearce "was unaware that his injuries could be attributable to the effects of ionising radiation until that possibility was drawn to his attention as a result of a television programme transmitted on or about 1 December 1982." The reference was plainly to one of the Nationwide programmes: see paragraphs 260 and 262.

330. The allegations of negligence (settled by Mr Patrick Elias, as he then was) were particularised on Mr Pearce's behalf as follows:

(i) Failing to recognise the potentially hazardous level of ionising radiation which would exist on or around Christmas Island preceding or following the said tests and/or failing to inform the Plaintiff of the same;

(ii) Failing to provide the Plaintiff with any, or any adequate, protective clothing;

(iii) Failing to provide the Plaintiff with a monitoring badge or device or otherwise to alert him and others to his exposure to hazardous and/or injurious alternatively potentially hazardous and/or injurious levels of ionising radiation.

(iv) Failing to make checks on the plaintiff, either adequately or at all, to determine whether he had been exposed to dangerous levels of ionising radiation, at the time of the said tests and/or subsequently thereto;

(v) Failing to give any or any adequate warning to the Plaintiff of the risks to his health created by the said nuclear test; and/or the activities carried on in connection therewith;

(vi) Causing and/or permitting and/or failing to prevent others from causing and/or permitting the Plaintiff to enter the said assembly unit to check and repair refrigeration pipes and/or to talk to persons therein;

(vii) Failing to give any or any adequate warning to the Plaintiff of the particular risk of exposure to radiation involved in entering the said assembly unit;

(viii) Failing to warn the Plaintiff either adequately or at all of the risks to health involved in eating locally grown fruit and/or produce arising from the possible contamination of the same by ionising radiation;

(ix) Failing to warn the Plaintiff either adequately or at all of the risks to health involved in swimming in the sea in the proximity of Christmas Island arising from the possible contamination of the same by ionising radiation;

(x) Failing, either adequately or at all, to decontaminate the area in and around Christmas Island from the influence of ionising radiation.

(xi) Failing generally to take any or any adequate precautions to protect the health and safety of the Plaintiff.

331. Whilst the precise wording differs from that of the wording of the particulars given in the Master Particulars of Claim (see paragraphs 59 and 60), the substance of the case being advanced then in Mr Pearce's case so far as breach of duty is concerned was very much along the lines of the overall case now being advanced on behalf of all the Claimants in this action. The present case does, of course, involve Claimants who were in locations other than merely Christmas Island.
332. The Defendant suggests that a case like *Pearce* contributed to a "massive corpus of knowledge into which any Claimant who had suffered a significant injury could (and should) have tapped". This argument is addressed in the context of suggesting that any Claimant who had suffered a significant injury to his health by the mid-80s or early 90s should have had "constructive knowledge" of its attributability to ionising radiation to which he was exposed during the tests. Although the word "fall-out" is not used in the allegations of negligence quoted, it is implicit that at least some of the "contamination" alleged must have been as a result of fall-out. The Defendant submits that it is clear that the general case based on fall-out in the present proceedings is not new – and indeed was made many years ago - and reveals nothing new that might have been capable of justifying the delay in this case. I will be returning to this argument later (see paragraphs 620-625).
333. The Defendant has also suggested that *Pearce* simply confirmed that section 10 of the Crown Proceedings Act *never* afforded a defence to any proceedings that might have been brought so that if any of the Claimants had taken proceedings they would not have failed on that basis. I am bound to say that I am not impressed by that argument. The Ministry of Defence had long made it clear that it would take the (as it turned out, misconceived) section 10 point in any proceedings launched. It seems to me perfectly reasonable, in the light of that, that any Claimant who was anxious about that issue should await a decision that resolved it. The issue of the delay since then is, of course, a different issue and I will return to it in paragraphs 572-611.
334. The other side of the argument arising from *Pearce* is that no limitation point was taken in the case. The Defence did not raise the issue and Ralph Gibson LJ noted specifically that the defendants "do not claim to rely on the Limitation Act 1980." The contention that the claim was statute-barred was at least arguably open given that Mr Pearce's lymphoma had emerged by 1978. Since the view of the Ministry of Defence at the time was that a fair trial of the issues would have been impossible, it is surprising that the point was not taken. The Ministry's position at the time was articulated by Mr Robin Auld QC in his closing submissions to the McClelland Commission (see paragraph 392) when he said this:

"It is well nigh impossible to try to reconstruct in a comprehensive and accurate form what happened thirty years ago through the medium of oral evidence unaided in the main by the contemporary documents. This is what this Commission has attempted to do throughout most of its sittings in Australia. Many of those involved in the tests who could be found were now elderly or in late middle age. Some key witnesses could not be found at all or were too infirm or too far away from the proceedings to be able to give evidence. Without the assistance of records to refresh their memories, many could not remember the events of so long ago with accuracy or detail. There were

those who did claim to remember matters of importance, sometimes at second or third hand and often well publicized in the newspaper, radio and television reports of the proceedings. Where the evidence of these witnesses could be checked they were often shown to be wrong in their recollection on later and less well-publicized days, when the relevant documents had been found.”

It was also submitted to the Commission that the detailed allegations in respect of matters then 20 or 30 years ago “could not properly be tested now [i.e. in 1985] in individual civil proceedings”. It was put this way:

“In the course of the Inquiry many detailed allegations have been made against the UK and Australian authorities, particularly in connection with the enforcement of standards of safety at and after the tests and in connection with the security of the Ranges. The UK has attempted to investigate some of the more lurid allegations, which have attracted particular attention. These are dealt with in the appropriate sections of this Submission. As will appear, when it has been possible to check them against records of the time or through the evidence of others, these allegations have, in the main, been shown to be unfounded. But, in general, it is impossible to investigate and produce evidence so as to refute or confirm, as appropriate, each of these allegations. Most of them relate to matters over 20 or 30 years ago, and could not properly be tested now in individual civil proceedings. The Commission is certainly not equipped to make findings on them.”

335. Mr Browne has made the point that if the evidential difficulties were so great at that time, the further delay since then has made no difference. I will return to the issues of delay later at paragraphs 572-611. However, the fact that no limitation point was taken in 1985 is, it may be thought, some support for Mr Browne’s comment that until these proceedings had been brought it had never been said before on behalf of the Government that any claim, if launched, was too late. Mr McGinley, who has been directly interested in all these matters at least since 1982, said in his supplementary witness statement that “[we] were never told that our claims would fail because they were too late. The reason we were given was that the evidence did not show any connection between our exposures to radiation and our illnesses.” He suggests the Government is “relying on a new tactic.”
336. There is, of course, no reason why the Defendant in its litigation role should not now take a point that, for whatever reason, it decided not to try to deploy previously. However, whilst another 24 years have passed since the opportunity to take the point in *Pearce* presented itself, the charge of inconsistency in that role is a difficult one for the Defendant to resist.
337. Mr Crossley was asked by the Claimants’ legal team during the proceedings what steps were taken by the Ministry of Defence to prepare its defence to Mr Pearce’s claim, including the marshalling of documents for discovery and the preparation of witness statements. Although he had no personal involvement in the case his

inquiries led him to say that, pending resolution of the section 10 issue, no discovery exercise took place and no witness statements were prepared. A discovery exercise did take place after that issue had been resolved, but the claim was discontinued and so it went no further. No witness statements were taken.

338. As will be apparent from the comment I have already made in paragraph 336, I am less surprised about that than I am that the limitation point was not taken in Mr Pearce's case if it was felt that resisting what were arguably very stale claims even then represented a significant hurdle for the Ministry of Defence.

(iv) The funding issues

339. As appears from paragraph 434, at least some of the initial investigations in the present case were carried out with the benefit of public funding from the Legal Services Commission and that funding enabled the institution of the proceedings in late 2004. Following service of proceedings on 21 April 2005 the Treasury Solicitor agreed an extension of time for service of the Particulars of Claim which was subsequently further extended due to difficulties with the Legal Service Commission funding certificate. However, on 17 August 2005 the Legal Services Commission withdrew public funding. I have seen no official documentation evidencing the reasons for this, but Messrs Alexander Harris wrote to the Treasury Solicitor on 26 August 2005 in these terms:

“We can confirm that the basis for the Legal Services Commission's recent decision to cancel public funding for this litigation is primarily centred around a cost/benefit analysis.

In essence, the Legal Services Commission stated that the legal merit of the case was insufficient to justify the case being pursued at the public expense. Further, the cost benefit ratio of the case, in the view of the Legal Service Commission was insufficient to justify continued public funding and that if there was such continued funding, the Legal Services Commission felt that it was unlikely that we would be in a position to serve proceedings within the agreed stayed period of 4 months.”

340. I understand that no appeal was pursued in relation to that decision which was, of course, taken before the full impact of the Rowland Report (see paragraphs 401-441) emerged. There was then a hiatus in the proceedings until Messrs Rosenblatt, the solicitors who now conduct this litigation, assumed conduct of the case. That hiatus was at least in some part as a result of agreement between Mr Harris and the Treasury Solicitor and based upon the need to put in place alternative funding and to await “scientific literature” which could only mean at that time the Rowland Report. The essential findings of the Rowland Report emerged by no later than early May 2006 (see paragraph 401) and I assume that that may well have had a considerable influence on the funding issue. Notices of Change for the Claimants represented by Messrs Alexander Harris were served on 21 April 2006 and for the Claimants represented by Messrs Clarke Willmott on 4 July 2007, 7 August 2007 and 31 August 2007. I understand that a Conditional Fee Agreement (‘CFA’) backed by after-the-event (‘ATE’) insurance, limited to the limitation issue alone, had at some stage in

that overall period been put in place to enable the proceedings to continue and indeed operates as the basis for the funding of the current litigation.

341. The Defendant asserts that public funding has been withdrawn and “the reason that the claims have progressed to this stage is simply that a new set of lawyers has been willing to progress the claims this far on CFAs.” It is suggested that this constitutes a similar state of affairs to that which existed in *Hodgson v Imperial Tobacco Ltd and others*, the case in which a group of claimants sought to pursue various tobacco companies in respect of lung cancer alleged to have arisen through smoking cigarettes with excessive carcinogenic substances within them. I have been pressed with the submission that Wright J, in an unreported judgment given on 26 February 1999, declined to exercise his discretion under section 33 in the each of the Lead case claimant’s favour because he held that the only thing that really explained the delay in taking proceedings after relevant knowledge had been acquired was “the willingness of the Plaintiffs’ solicitors and counsel to act under CFAs.”
342. I will, of course, consider section 33 if and when it arises. However, I should say now that generally I do not find this submission persuasive. Restricting myself for the moment purely to the funding issue, it is obvious to anyone who has had dealings with personal injury litigation over the last 10 years or so that public funding for personal injury litigation has become more and more restricted and that CFAs have effectively taken over in this branch of litigation save in very limited areas. If there is anything pejorative intended in the Defendant’s submission, then I reject it: as indicated below, the chances are that the only way that claimants such as the Claimants in this litigation could pursue a case would be on the basis of a CFA.
343. Mr Crossley asserts that absence of funding is not a good reason not to proceed and draws attention to the group actions brought in the 1970s, 1980s and 1990s suggesting that Legal Aid would very likely have been available for a properly-prepared group action involving many hundreds of claimants, as it was for other group actions over the last 20 years or so, including the Opren litigation, the Benzodiazepine litigation, the Creutzfeldt-Jakob Litigation (Human Growth Hormone), the BSE Litigation and others. He says that from 1994 to mid-1997 alone, the Legal Aid Board entered into thirteen group action contracts for litigation relating to Gulf War syndrome, the MMR vaccine, Radiotherapy breast cancer treatment, Vibration White Finger and others. He included in that list the smoking litigation, but noted that Legal Aid was withdrawn in 1996. It is said on behalf of the Defendant that the position with regard to the availability of funding was more generous to claimants in the 1970s, 1980s and 1990s when Legal Aid was in principle available both for unitary and group personal injury actions.
344. I have no doubt as to the accuracy of the facts underlying those assertions. I have some reservations about their true relevance to the issues in this case.
345. Whatever may have been the position in previous days, it is difficult to resist the conclusion that the accumulation of the resources necessary now to bring a collective legal action on behalf of a sizeable group of people allegedly affected by the actions or omissions of a powerful and well-resourced body requires something more than recourse to public funding. The individuals concerned cannot be blamed for that. If it be the case that a potentially successful claim can be initiated only at a time when the

sole means of funding it is by a CFA, that is, so far as I can judge in this case, merely a function of fortuity.

346. So far as the decision in the tobacco litigation is concerned, leaving aside the fact that it was made at a time when the movement from public funding to CFAs in personal injury litigation was in its relative infancy, the underlying facts were very different from this case. Wright J, who was nominated to be the trial judge if the limitation issues were overcome by the claimants, was obliged to consider (as I will be in this case if section 33 becomes engaged) the “broad merits” of the claims. All of the claimants in that litigation chose to smoke and did so against the background of knowledge of the potential damage to their health of doing so. As Wright J observed, even if primary liability could be established against the tobacco companies on the basis alleged (namely, of not reducing the tar levels in cigarettes and/or warning about the dangers of certain tar levels), there would be major issues of causation, *volenti non fit injuria* and/or contributory negligence. In the present case, the majority of the claims are made by or on behalf of men who at the time of the material events were largely young conscripts who had no choice about attending the tests and who, to the extent that they gave any consideration to the matter, were reassured that they would not be exposed to any danger. Further, as Mr Browne has observed, in this case all Governments have consistently denied material exposure to ionising radiation and any provable link between any exposure, if it occurred, and most, if not all, of the illnesses or conditions of which the veterans complain.
347. It follows that, whilst the matters to which I have referred in relation to funding do not of themselves enable the Claimants to surmount the limitation hurdles in this case, equally they do not, in my judgment, represent the kind of obstacle to proceeding that they did in the tobacco litigation.
348. A central issue in the evidence concerning the effects of ionising radiation on the individuals at the tests is the validity of the National Radiation Protection Board reports to which I will now turn.

(v) The National Radiation Protection Board (NRPB) reports and other studies - summary

349. The circumstances in which the NRPB first came to be involved in assessing the impact of the tests is dealt with in paragraphs 262-263.
350. Of the three studies completed (1988, 1993 and 2003) the first two were conducted by Sir Richard Doll, Dr Sarah Darby (both of whom are described by Professor Louise Parker as “highly respected UK epidemiologists”) and others. The third was conducted by some members of the original teams plus others. The studies are said by the Defendant to have been independent large scale epidemiological studies of 85% of UK test participants, the conclusions from which are consistent with other studies carried out in New Zealand, Australia and the USA. The effect, it is said, on the basis of Professor Kaldor’s analysis, is to demonstrate that the vast majority of participants were exposed to very low levels of radiation based on the available means of determining exposure (see further at paragraphs 376-387 below) and that there is no substantial difference between the incidence of the diseases complained of by the veterans (and alleged to be due to radiation) and that of those in the control group save possibly for a small increase in the incidence of leukaemia. The Claimants

challenge the validity of the conclusions reached by reference to the levels of exposure upon which the studies were based and upon aspects of the methodology (see paragraph 365 below).

351. For present purposes I will merely record, in summary form, what each study involved and what the conclusions (whether justified or otherwise) were. I will highlight later in general terms the criticisms made.
352. The first NRPB cohort study set out to investigate possible links between participation in the tests and mortality and the incidence of cancer by comparing what was known of 22,347 test participants with a similarly-sized control group (22,326) of men with similar backgrounds and experience to the participants, but who did not attend the tests. The authors of the report, who acknowledged the difficulties of identifying all the participants because no “comprehensive list of participants had been compiled at the time”, estimated that 83% of all participants were included. The study was “a study of the health of the participants, investigating whether it showed any correlation with radiation exposure.” The information in relation to the health of the participants was determined by reference to the death registration documents where they existed and the incidence of cancer through the NHS Central Register. The cut-off date for inclusion of the consequences within the study was 31 December 1983.
353. There was no significant difference in mortality between the two groups (1591 in the participants and 1607 in the control) or in death from cancer (406 cf. 434). There was a significantly higher level of deaths from leukaemia and multiple myeloma (22 and 6 respectively, compared with 6 and 0). In the Abstract at the beginning of the study it was said that this difference was “largely due to the extraordinarily low rates [of death from these diseases] in the controls ... while the mortality in the participants was only slightly greater than expected from the national rates ... and much of these differences seems likely to have been due to chance.” This led to the conclusion that “small hazards of multiple myeloma and leukaemia may well have been associated with participation in the nuclear weapons programme”. The way it was put in under ‘Conclusions’ was as follows:

“On balance it is concluded that there may well have been small hazards of leukaemia and multiple myeloma associated with participation in the programme, but their existence is certainly not proven, and further research is desirable. The only carcinogenic agent that has been shown to cause an increased incidence of both these diseases is ionising radiation, but there is no specific evidence that the test participants who developed these diseases were exposed to unusual amounts.”
354. The study also expressed the conclusion that participation in the tests was not associated “with any detectable effect on the participants’ expectation of life or on their total risk of developing cancer”.
355. Because of what was said by the NRPB to have been the generally inconclusive nature of the study, taken with the surprising finding of a lower mortality from smoking-related diseases in the participants than in the control group, it was felt that further observations would need to be made and it was recommended that the observations should be continued for 10 years. The reasons for suggesting this were

set out fully in the recommendations and the recommendations concluded with this paragraph:

“It should be noted ... that any new evidence relating to the incidence of leukaemia in the participants will be of limited value as the risk of leukaemia following exposure to ionising radiation diminishes appreciably more than 10 years after the exposure has occurred, unless any of the exposure was due to the ingestion or inhalation of long lived radionuclides. This qualification does not apply to the risk of multiple myeloma nor, in all probability, to the risk of many other cancers.”

356. The reference to exposure to ionising radiation being due to “the ingestion or inhalation of long lived radionuclides” has a resonance with the way in which the Claimants seek to advance their cases in these proceedings.
357. In fact the second NRPB study was commissioned earlier than would have been the case had the full 10-year period run its course. The cut-off date for inclusion in the new study was 31 December 1990, thus providing evidence from a further 7 years during which period there had been a further 2488 deaths in both participants and controls.
358. A further analysis of the records since the first study was reported resulted in 1503 “participants” who had been included in the first study being removed from the cohort (who were assessed to have had no more potential to exposure than the general public) and 514 previously unidentified being included, the total participants in this study being 21,358. The control group consisted of the original 22,326 plus 7 others who had been identified at the time of the first study, but whose service record could not be identified at the time.
359. The conclusions drawn by the authors of the study were again that there had been no detectable effect on the participants’ expectation of life, nor upon their risk of developing cancer or other fatal diseases. It was acknowledged that the participants may have experienced “a small risk of developing leukaemia in the first 25 years after the tests”, but, it was said, “possible explanations for such a risk are unknown and it is concluded that the excess of leukaemia in test participants compared with controls that was noted in the previous report is likely to have been a chance finding.” The same conclusion was reached in relation to the risk of developing multiple myeloma. The further data obtained in this second study did not support the notion that participants smoked less than the members of the control group.
360. I refer to the public impact of the effect of this study in paragraph 289. There was no recommendation in this second report for a further follow-up. As I record at paragraph 299, there was thereafter some concern on the part of the veterans that the records underlying this study would be destroyed.
361. I can pause briefly at this point to highlight, without specific comment, the criticisms that are made of these reports. For the purposes of these proceedings, the critique on the Claimants’ side has been provided by Professor Louise Parker, an epidemiologist at Dalhousie University, Nova Scotia, Canada. I will summarise some of the points she makes about these two studies, in particular, shortly, but it will be apparent from

my review of the history of the BNTVA that that association had been critical of the studies (see, eg, paragraphs 271 and 289).

362. Mr McGinley, when he gave his evidence, said that the studies did not look at those who were living and suffering from radiogenic diseases: his point was that they looked only at those who died.
363. Criticisms similar to those now made by Professor Parker were made on Miss LCB's behalf in the case of *LCB v United Kingdom* (1999) 27 EHRR 212, paragraph 55.
364. It does follow, in a broad sense, that the deficiencies of these studies, as they are alleged to be by the Claimants, were articulated long ago. It is a point relied upon by the Defendant in the limitation argument.
365. Professor Parker's broad criticisms include the following:
 - i) There are concerns about the identification of the group of participants. Since about 15% of the participants are missing from the studies, the validity of the conclusions depend, she says, critically on whether the missing 15% were the same or different from the 85% in terms of exposure and health outcome. There are grounds, she asserts, for believing that the missing 15% contained a significant number of those whose health was poor. (She cites the studies carried out by Dr Sue Rabbitt Roff in support of this assertion: see paragraphs 301 and 368-369).
 - ii) There are concerns about the inclusion within the control group of men exposed occupationally to radiation.
 - iii) There were significant deficiencies in the evidence of exposure from the monitoring carried out. Only 20% of all participants had film badges (some with high detection thresholds) and even then the monitoring was not continuous and would not, in any event, have monitored for internal ingestion or inhalation of radioactive material.
366. Professor Parker also says that the way in which the conclusion relating to life expectancy of the participants was expressed was misleading and not justified by the results of the surveys. She also comments on the restricted nature of the surveys (i.e. to those who have died and whose cancer had been registered rather than obtaining a more generalised "health" picture).
367. These studies have been advanced as justification for the stance taken by the Ministry of Defence as exemplified in many statements made relating to the effects to some of which attention is drawn in paragraphs 388-391 below.
368. Before moving to the third NRPB report, I should note two other contributions to the investigation of the health effects of participation in the tests. In my review of the history of the BNTVA I mentioned the involvement of Dr Sue Rabbitt Roff from about 1995 onwards (see paragraph 300 *et seq*). I deal with the general effect of her studies in that part of the judgment. She considered the death notifications received by the BNTVA over a 14-year period from 1983 to 1997. The Report became available during 1999. It is difficult to do justice to it in a sentence, but her

conclusion following this study can be deduced from the following extract of the Abstract:

“The Ministry of Defence still routinely issues a document to nuclear veterans who feel that their illnesses were caused by the radiation they encountered when they were young men which states:

‘The background [radiation] dose received by civilians and members of HM Forces serving at or off Christmas Island in the years 1956 to 1964 was only about 35% of that which they would have received on average had they remained, for that period of their lives, in the United Kingdom - that is, some 100 microsieverts per calendar month less at Christmas Island than in the United Kingdom.’

This sanguine view of the health burden borne by nuclear veterans and their families is not borne out by the data reported in this study of the health outcomes of the 2,500 men (2,200 UK, 238 New Zealand and 62 Fijian) on whom data are available to the present researcher. Thirty per cent of the men in this sample have already died, mostly in their fifties. Two-thirds of them died from cancers that are pensionable in the United States as presumptively radiogenic among nuclear veterans. About one in seven of the men in the sample of 1,014 who responded to the questionnaire circulated in late 1997 did not father any children after they returned from the weapons tests. Among the nearly 5,000 children and grandchildren of this group of more than a thousand veterans, there are 26 cases of spina bifida alone - more than five times the usual rate for live births in the UK.”

369. The Abstract concluded with the following:

“The data in this study point to an accelerated rate of death for the UK nuclear veterans at precisely the moment the NRPB studies terminated, and the UK Ministry of Defence acknowledged in late 1998 that the finding in relation to multiple myeloma alone compels a re-analysis and updating of the NRPB studies. But radiobiological tests are now available which can detect evidence of past radiation exposure. It is a major recommendation of this study that research henceforth proceed beyond the epidemiological to the clinical and pathological levels. Then at least medical science can learn from this 40-year-old tragedy with its cast of thousands.”

370. Leaving to one side the somewhat emotive final sentence, the recommendation would seem to presage the kind of study carried out a few years later by Professor Rowland and his team in New Zealand (see paragraphs 410-441).

371. The period when Dr Rabbitt Roff was conducting her study overlapped to a degree with the period when Mr Phelps-Brown and his colleagues were looking into whether elevated levels of chromosome translocations could be responsible for cataracts in UK veterans. I deal with this generally in paragraphs 303-306. The conclusion of the study, published in 1997, was that it provided “no evidence that high unrecorded doses of ionising radiation have been received by UK Test Veterans who have subsequently developed [posterior subcapsular cataract]” It was also said that the study highlighted “the problems faced in attempting to use even the most powerful chromosomal techniques for estimating historical exposures to low doses of radiation.”

372. As indicated in paragraph 360, there was no recommendation after the completion of the second NRPB report that a further follow up should be undertaken. However, it seems that the publicity surrounding the results of Dr Rabbitt Roff’s first study caused the United Kingdom Government to commission a third study from the NRPB. The Introduction to that third study sets the scene in this way:

“During the last few years, there have been reports of raised numbers of multiple myeloma among test participants, based on records for just over 2000 British servicemen in the British Nuclear Test Veterans Association (BNTVA) (Rabbitt Roff, 1999 A, B). In order to make a comparison between myeloma rates among the test participants and controls, and between these groups and national rates, MOD commissioned NRPB in 1999 to conduct a new analysis.”

373. The broad way in which this study was conducted is reflected in paragraphs 310-315 relating to the history of the BNTVA and there is no need for me to elaborate upon it. The conclusion of the study was summarised in the concluding paragraph of the Abstract in this way:

“It is concluded that the overall levels of mortality and cancer incidence in UK Nuclear Weapons Test participants have continued to be similar to those in a matched control group, and for overall mortality to be lower than expected from national rates. There was no evidence of an increased risk of multiple myeloma among test participants in recent years. The suggestion in the first analysis of this study of a raised risk of myeloma has not been confirmed in longer periods of follow-up and is likely to have been a chance finding. Analysis of sub-groups with greater potential for exposure provided little evidence of increased risks, although the numbers of men involved were smaller and the statistical power was therefore less. In common with earlier analysis, there is some evidence of a raised risk of leukaemia among test participants relative to controls, particularly when focusing on leukaemia other than [chronic lymphatic leukaemia]. This could be a chance finding, in view of low leukaemia rates among the controls and the generally small radiation doses recorded for test participants. However, the possibility that test participation caused a small absolute risk of leukaemia other than [chronic lymphatic

leukaemia] among men cannot be ruled out; the evidence for any increase risk appears to have been greatest in the early years after the tests, but a small risk may have persisted in more recent years.”

374. Professor Parker asserts that the same criticisms as those made of the first two studies are relevant to this third study. In relation to leukaemia she says that there is no explanation given for the lower rate of leukaemia in the control group when compared with national rates, a comparison which, in any event, she regards as unsound. She does, however, comment that there remains an unexplained increase in the rates of leukaemia in the test participants’ group relative to that in the control group for the whole period of the follow up and for multiple myeloma for the early years of the study.
375. The monitoring carried out during the tests was fed into the NRPB reports. Is there any cause to doubt the accuracy of the information thus conveyed?

(vi) Monitoring

376. If any or all of these cases proceed to trial, the accuracy and reliability of the monitoring of those present at or in the region of the tests will loom large as an issue. It would go to the question of breach of duty and to the general causation issue given that the NRPB studies and many Government pronouncements have been based upon the presumed accuracy and reliability of the monitoring.
377. I refer in paragraph 90 to the general position taken on this issue in this litigation by the Defendant, more detail being given at paragraphs 428-429 below.
378. In order to make good that case the Defendant relies upon the provision of film badges and dosimeters to participants which were designed to measure exposure to gamma radiation, the essential case being that any person who was or might be exposed to gamma radiation was provided with one or other monitoring devices and the results were then recorded eventually in what were known as “the Blue Books”. Mr Crossley describes these as comprising a series of paper documents within blue covers containing the Atomic Weapons Establishment’s (AWE) lists of test participants’ recorded dose levels at the tests. They were produced in 1981-2 at the Atomic Weapons Research Establishment (AWRE, the forerunner of the AWE) largely from the contemporary Health Physics dose record sheets and covered the Armed Services, UK civilians and other participants. Mr Crossley confirms that the Blue Books were “transcriptions of information from other sources” and so were marked with the *caveat* ‘Provisional’. That was because some of the sources included only surnames, rendering unique identification of individuals with common surnames impossible in many cases. This *caveat* was communicated to the NRPB by AWE and was indeed acknowledged in the first NRPB study in the following terms:

“This document contains in confidence a summary provisional listing of names and relevant associated data, obtained from available UK information sources which were accessible to and reviewed by AWRE staff up to 26th April 1982, for persons who the information indicates were or may have been citizens of the UK and civilians taking part in programmes of UK

overseas field experiments, associated with UK defence (nuclear weapons) research and development projects, carried out in Australia, in the Pacific Ocean zone or elsewhere.

The listing is not claimed to be free from errors, incorrect assertions or omissions and the attribution or non-attribution of UK citizenship or employer to a particular name may not, in some circumstances, be correct: the information available was sparse, of varied quality, and often ambiguous or indeterminate.

This document and any entry of information or lack of entry or of information therein, is not and does not constitute and may not be construed or implied to be a formal summary record, a mandatory record or other record of individual doses of or exposures to ionising radiations.”

379. Those reservations related to the levels of gamma radiation recorded. They do not relate specifically to the recording of alpha- and beta-particle radiation. To the extent that they could be taken as some form of indirect indication of exposure to alpha- and beta-particle radiation (see paragraph 383 below), then those reservations must, as a matter of logic, be factored in to any analysis of the reliability of the records applicable to those kinds of radiation.
380. As I have indicated in paragraph 124, if any of these cases do proceed to trial, it is likely that there will be significant focus on the effects that alpha and beta particles (the most dangerous forms of ionising radiation: paragraph 142) may have upon DNA. The case for the Claimants is that there was no effective monitoring of this kind of radiation which emanates particularly from ingested or inhaled radioactive elements with long half-lives. It is, it is argued, a danger independent of the time of detonation.
381. That general assertion was made in the Claimants’ written opening and repeated by Mr Browne in his oral opening submissions. In the Defendant’s written closing submissions a number of points, to which I should refer, are relied upon to counter the suggestion. One assertion made by Mr Browne, to which exception is taken, was that “the Defendant appears to assert that the only monitoring carried out for beta radiation was the use of the gamma film badges or dosimeters, and those film badges did not detect beta radiation reliably at all.”
382. I will deal with the response to this assertion below, but it is accepted in Mr Crossley’s principal Generic Witness Statement that the badges “did not measure internal dose directly”. Indeed it should be added that the first NRPB report acknowledged that exposures “to neutrons and from internal contamination by radioactive materials will not have been recorded on personal film badge dosimeters”. That report and the subsequent report in 1993 referred to how the Ministry of Defence had “advised” that the “dose estimates” from these two sources “were negligible”.
383. The response to Mr Browne’s assertion was that it is not and never has been said that the only monitoring carried out for beta radiation was the use of film badges or dosimeters. The Defendant’s essential response can be summarised in the following propositions:

- i) It is unlikely that participants would have received a significant internal dose of radiation (including alpha and beta radiation) without also being at risk of receiving a significant external dose. Thus, as a general rule, monitoring for external radiation would indicate whether an internal hazard existed. Based, it is said, upon the expert evidence of Dr Lilley, the assertion is made that in order to receive a significant internal dose an individual would have to enter an area with high levels of re-suspendable fall-out which would also have been a source of (external) photon (which I understand to be another expression for gamma) and beta radiation. (I understand re-suspendable fall-out to be fall-out that becomes suspended in the air again by the action of the wind or other disturbance such as the action of vehicles.) In fact it is not clear to me that Dr Lilley has actually said this in the reports I have seen, although I imagine he must be the source of the proposition. It is said, therefore, to have been most unlikely that an individual could have received a significant internal dose of radiation without at the same time receiving a significant external dose, something which would have been indicated on the film badge or detected by the use of hand-held monitoring equipment.
 - ii) In any event, external beta radiation was in fact capable of being detected and monitored by the film badges. In the vast majority of cases, the doses indicated by the film badges were due to gamma radiation only because gamma radiation usually comprised all, if not most, of the dose received. The extent of the beta contribution to the film badge could, however, be assessed by the difference between the film densities under the shielded and unshielded areas of the film-badges. This latter assertion is based on an AWE Report "Issue of film badges at UK Atmospheric Nuclear Weapons Tests and Minor Trials (1952 – 1967)" prepared by A.C. Woodville in June 1993.
 - iii) Furthermore, environmental monitoring, using measuring devices other than film badges, was undertaken to monitor the presence of loose contamination. There are many documents, it is said, that suggest that environmental monitoring was done.
 - iv) Where significant levels of alpha and beta radiation were present in sufficient quantities to pose an internal radiation hazard, protective clothing and equipment was issued which, it is said, would have protected personnel from ingesting, inhaling and/or otherwise absorbing significant levels of alpha and beta radiation because of their limited penetrability (see paragraphs 125-126).
384. It is not, of course, for me to make any findings on this or any issue, other than those directly affecting the limitation issues. However, since I am obliged to form a view of the general merits of the case to be advanced on behalf of the Claimants when considering the section 33 discretion, I am bound to observe that this is an area where, on the material brought before me at present and without, of course, having had the benefit of the kind of expert assistance that would be available at trial, the Defendant's position does not appear immediately persuasive and would require considerable clarification at a trial. In other words, the Claimants appear to have at least a *prima facie* argument in this regard.
385. In the first place, it is accepted that only about 20% of participants were provided with badges and that the monitoring in any event was not continuous so that general

conclusions as to exposure across the whole cohort of participants may not be reliable. Second, I note that Dr Regan challenges Dr Lilley's view that an internal dose would not be expected in the absence of a detectable external dose, citing the inhalation of Plutonium-239 (described as an alpha-emitter) as an example of an event that would not be reflected in an external dose measurement. Indeed I do not, as presently advised, see how wearing an external badge for a limited period would necessarily monitor internal radiation exposure from ingested or inhaled radioactive material affected by elements with long half-lives. Third, I am unable to follow how protective clothing would have prevented the ingestion or inhalation of radioactive material that could have emitted alpha or beta radiation. Fourth, it appears at first sight to conflict with some internal documentation disclosed emanating from the Health Physics Group at Aldermaston in early 1953 dealing with "the relative importance of doses from beta particles and gamma rays from ground contaminated with fission products." (The paper does not appear to deal with alpha particles, but one of the fission products considered is Plutonium-239.) The following is recorded:

"A most important consideration [is] that the measurement of dose by the gamma-detecting instruments gives an erroneous picture of the true hazard present. The normal measuring instruments such as those used for Civil Defence purposes even when supplied with a so called "Beta window", merely gives an indication of hard beta radiation. This reading is not indicative of the total dose.

...

It is unfortunate that much credence has been given to the belief that protective clothing is a complete shield for beta particles. Our results indicate that when the dose over the fall-out area of an explosion is considered unusually heavy clothing ... would be required to lower the dose due to beta particles to values comparable with that due to gamma rays.

...

The significance of this is that when reclamation or inspection is to be carried out over a target area after 100 days and if personnel are allowed access to the active area for a period commensurate with the maximum permissible dose, they will receive a severe over exposure to beta radiation."

386. As presently advised, therefore, there does seem to me to be a case that would need answering about the extent to which (i) there was true protection against alpha and beta radiation, in particular, from the inhalation and ingestion of fall-out or fall-out contaminated material and (ii) the monitoring actually carried out gave a reliable indication of the overall radiation dose received from all sources, internal and external, over a prolonged period of time. This would feed in to the issue of the whether the NRPB reports can properly sustain some of the claims made about them.
387. As I have said, I would not wish these observations to be taken as suggesting that I have formed a concluded view about these matters. I have not and it would be quite

impossible for me to do so at this stage. All I am saying is that, on the material presently before me, it is a legitimate area for investigation by the trial judge if, all other factors permitting, a trial on the merits should take place.

(vii) The essential position taken by successive governments over the years

388. The first NRPB report in 1988 (see paragraphs 352-354) records the following in its introduction:

“The Ministry of Defence ... has always believed that only a small proportion of the UK participants could have been exposed specifically to ionising radiations by virtue of the participation and that those who were exposed received only a small radiation dose.”

389. This indeed sets out accurately the view which was articulated by the then Prime Minister, Mrs Margaret Thatcher, in a letter to Mr Frank Cook MP dated 11 July 1986 when she said this:

“The Government's view is that exposure to radiation from the tests had not been shown to be the cause [of certain illnesses suffered by veterans]. Firstly, very few were exposed to radiation at all in excess of natural background. Secondly, the exposures of those who did receive measurable excess (with a few known exceptions) were small. Thirdly, the risks associated with these exposures are known to be very low indeed.”

390. This position was articulated in a number of responses to claims for pensions made by veterans and reference to the late Mr Clark’s case (see paragraph 733) demonstrates an example.
391. This remains the position generally taken (see paragraphs 259 and 308) and is, of course, reflected in the substantive Defence formulated to the claims advanced in these proceedings (see paragraph 430).

(viii) The Royal Commission into British Nuclear Tests in Australia

392. In 1981 a television documentary in Australia entitled “Backs to the Blast, an Australian Nuclear Story” gave an account of the British nuclear tests carried out in Australia and of the effects the tests had had upon the participants, the indigenous population and the land concerned. As Mr Crossley’s Generic witness statement says, it “led to considerable publicity and political repercussions in Australia” and to the setting up of the Australian Royal Commission, chaired by Justice James McClelland.
393. The Terms of Reference of the Commission were to inquire into the British nuclear tests conducted in Australia during the 12 years commencing January 1952 including the nature and adequacy of measures taken to protect against exposure to ionising radiation, radioactive substances and toxic materials, the management and conduct of the tests, the monitoring of fall-out and the health effects of the tests. It was to look

also at the measures taken, both at the time of the tests and afterwards, to manage the test sites.

394. Mr Crossley indicates that oral evidence was taken in various locations in Australia and in London between September 1984 and July 1985. In all, the proceedings lasted 118 sitting days, heard 311 witnesses and generated a transcript of 10,424 pages. A further 210 statements were tendered on behalf of persons not called to give evidence. Of those who gave evidence, 8 were UK advisers/specialists, 33 were UK scientists/technicians, 53 were UK servicemen, 241 were Australian servicemen and 48 were Aborigines.
395. As indicated in the section of this judgment dealing with the history of the BNTVA (paragraph 274), the Commission took evidence in the United Kingdom in January and February 1985.
396. The eventual consequence of the Royal Commission and further negotiations between the UK and Australian Governments was a formal Exchange of Notes in November/December 1993 whereby the UK Government agreed to pay (on an *ex gratia* basis) the total sum of £20 million by instalments on certain specified dates between January 1994 and October 1998. The precise terms of the agreement do not matter greatly for the purposes of the issues that I have to consider, but the Defendant relies to some extent on the perception that may have been created that this was in some way payment by the UK Government to Australian individuals allegedly affected by the tests.
397. I can deal with that matter quite shortly. It may well be that such a perception did exist in the minds of some, but in none of the Lead Cases was there any evidence that anyone had such a perception, even if the work of the Commission was known about. Those who were active in the BNTVA at the time (including Mr McGinley) would, of course, have known about the work of the Commission and, almost certainly, of the eventual outcome of the negotiations between the Australian and UK Governments. However, I do not think that anything that emerged from the work of the Commission or the eventual arrangements between the Governments really advanced anyone's knowledge on the matters that are crucial to the issues before me. As will appear in due course (see, eg, paragraph 590), I do think that the work of the Commission has some bearing on aspects of the section 33 discretion.
398. In one sense, what the original documentary and the consequent Royal Commission did was to bring into relief in the Australian context matters that were coming into focus in the UK (and elsewhere) about the long-term consequences of the nuclear test programme. It reinforces the view that it was not until the early to mid-1980s that public awareness of the issues started to be engaged.
399. I should, perhaps, refer to one matter that was considered by the Royal Commission, namely, the 'guinea pig' allegation. The Commission considered some of the documentary material upon which this allegation has come to be founded, including the report of the Chiefs of Staff of 20 May 1953 which spoke of the need to discover "the detailed effects of the various types of explosion on equipment, stores and men with and without various forms of protection" and heard evidence from former members of the BUFFALO Indoctrinee Force. In its report the Commission recorded that the allegation that the troops were being used as human guinea pigs was first

raised during the planning stages of the tests and was denied by both the UK and Australian authorities at the time. The Commission rejected the allegation and concluded that report of the Chiefs of Staff had been quoted out of context and that the “men” were in fact “dummies in service uniforms”. (I should add that there is reference in some of the documentation before me of consideration being given to “guinea pigs” in that form – in other words, plainly not human “guinea pigs”.)

400. Whether the Commission dealt with what various individuals may have thought, or may now continue to think, constitutes the ‘guinea pig’ issue is not something upon which I can draw any firm conclusion, but it does appear that this broad allegation did receive some scrutiny from the Commission.

(ix) The Rowland Report

401. The study carried out by Professor ‘Al’ Rowland and his colleagues at Massey University in New Zealand has assumed considerable significance in this case. It was seen by Mr McGinley as “an extremely big breakthrough” and reference was made to an aspect of the study in the article in the *Mail on Sunday* on 7 May 2006 which was headlined ‘Damning new evidence that could finally win justice for 1,000 nuclear bomb test veterans of Christmas Island’. It was that article that Mr Ayres saw (see paragraphs 644 and 646). Are these claims justified and what is the significance of the study in the context of the limitation issue? It is necessary, in the first instance, to say a little about its history.
402. The Royal New Zealand Navy provided two frigates, HMNZS Pukaki and HMNZS Rotoiti, with over 500 naval personnel, for the purposes of the GRAPPLE series of tests (see paragraph 36 above). Their purpose was to monitor the weather conditions, monitor the exclusion zone around the area where the tests occurred and to witness the explosions.
403. Over the years there were those who served on the two frigates at the time (plus others who had been involved in other tests) who felt that various health problems from which they suffered may have been attributable to that service. I have not been given full details of the background, but the witness statement of Mr Roy Sefton, Chairman of the New Zealand Nuclear Tests Veterans Association (NZNTVA), speaks of “pressures from veterans” that led to a report in 1990 prepared under the auspices of the Department of Community Health in Wellington, New Zealand, entitled “Mortality and Cancer Incidence in New Zealand participants in the UK Nuclear Weapons Tests in the Pacific” (Pearce). Some five or six years later the NZNTVA was set up and over a period of two years or so identified most, if not all, of those who had served on the ships.
404. In due course, the New Zealand Government provided some funds for the research carried out by Professor Rowland, additional funds being supplied by the NZNTVA and others. Professor Rowland, whose field was genetics, had met a group of veterans in 2000 who apparently raised with him the question of whether they had sustained any chromosomal damage as a result of their involvement in the tests in the 1950s. According to his (unsigned) witness statement, Professor Rowland had experience of what is said in the statement to be “a technique known as FCE”. I am inclined to think that this is a misprint for SCE – or certainly the expression is intended to relate to SCE. SCE stands for “sister chromatid exchange”. As its name

suggests, this process includes the exchange of genetic material between chromatids (a chromatid being one half of a normal chromosome: see paragraph 154) and is, as Dr Firouz Darroudi says in his main report, “a form of chromosome aberration”. At all events, it was Professor Rowland’s interest and experience in this area that led to the putting together of the research project that, in due course, yielded what, in this case, has been called “The Rowland Report”.

405. Professor Rowland says in his statement (which has not been challenged in the proceedings before me) that the overall cost of the study once it was completed was over NZ\$300,000 (in the region of £113,000), which was six times his original budget cost. It is clear from his statement that, had additional funds been available, he would have wanted the study to have been more extensive. However, that was not possible and, as it turned out, would probably not have made any difference in any event (see paragraph 406 below).
406. It took between 12-18 months to obtain all the relevant approvals that needed to be in place so that, according to Professor Rowland, “the scientific basis for the study was rigorous.” The study involved a (blind) comparison between the genetic patterns in chromosomes from blood lymphocytes of a cohort of 50 veterans and 50 men of a similar age with either an army-service or police-service background who had not been involved in the tests and who had not been exposed otherwise to any significant ionising radiation. Professor Rowland says that a crucial part of the project was the selection of the members of the control group and that it proved to be an expensive part of the exercise. In the peer-reviewed article the authors gave a detailed account of the reasons for excluding certain potential members of the control group. Professor Rowland also says that the choice of the veterans proved difficult so as to ensure that those with what are known as “confounding factors” (e.g. exposure to X-rays) were excluded. He says that, even had additional funds been available, it would not have been possible to find more than 50 veterans who met the necessary criteria. (Incidentally, one veteran’s lymphocyte cells failed to grow so the size of the veterans’ group for the purposes of the survey was reduced by one.)
407. The main study took about three years to complete. A parallel study was carried out, using the same cohort of veterans and controls, to determine whether there was any difference between the SCE frequency in the two groups. The SCE assay that forms the subject of that study, and which was the subject of a report in 2005, detected a small but nonetheless significantly higher frequency of SCE in the veterans compared with those in the control group. The report was accepted for publication in ‘Cytogenetic and Genome Research’ in 2007.
408. The same cohort was subjected to three further assays, one of which was the M-FISH (multicolour fluorescent *in situ* hybridisation) assay. This is described by Professor David Brenner, the Higgins Professor of Radiation and Biophysics at Columbia University, New York, in these terms:

“FISH ... is a mature biophysical technique in which different chromosomes are “painted” different colours, and can be visualised using microscopy. Painting individual chromosomes allows chromosome breaks and subsequent inter-chromosomal rearrangements to be visualised; for example seeing two colours (as opposed to one) within a single chromosome is

incontrovertible evidence of chromosome breakage followed by an inter-chromosomal rearrangement. The number of these colour junctions can then be related to the radiation dose that produced them.

Standard FISH methodologies, as used since the 1980s, typically involves measurements of only three chromosomes in each examined cell, and uses that information to extrapolate the damage to all the other chromosomes in each cell. Thus, typically, only effects in about 25% of the genome are actually measured with standard FISH, which means that the effects in the other chromosomes have to be estimated (essentially guesstimated) or extrapolated, in order to produce a dose estimate. By contrast, multicoloured ... FISH ... analyses all the chromosomes in each cell. The result is both improved statistical power and elimination of the need to extrapolate/guesstimate the damage to all the other chromosomes that are not measured with standard FISH.”

409. Professor Rowland says that the M-FISH technique was not available until the late 1990s and was, accordingly, “new science” when he and his team came to deploy it. He emphasises that the type of study undertaken by his team “would simply not have been feasible at an earlier stage in the absence of the more sophisticated tools at our disposal for the purpose of testing and in light of our developing knowledge in this area of science.” He said that once the M-FISH technique became available “any organisation wanting to carry out a similar survey would have needed access to a considerable amount of funding and the expertise of a University research department.” There does not appear to be any realistic basis for contesting that assessment. However, in his Generic Witness Statement, Mr Crossley suggested that “[with] proper diligence ... cytogenetic testing results could have been obtained by the Claimants much earlier” than the Rowland study. Mr Crossley notes “that the Rowland study was funded by the New Zealand Nuclear Test Veterans Association (NZNTVA).” This theme was repeated in the Defendant’s Opening Submissions where it was suggested that “the essential science underlying the study was approximately 20 years old and could have been implemented earlier with proper diligence”, the further suggestion being made that “the BNTVA knew of this technology as early as 1996, 8 years before issue.”
410. If the “technology” there referred to is the M-FISH technique, the evidence before me is that was not available until the late 1990s and I have no reason to doubt it. Indeed this seems to be confirmed by an article in the ‘European Journal of Human Genetics’ (1999) by Tanke and others which begins its concluding discussion with this sentence: “Despite its only recent introduction, multicolour FISH karyotyping has changed cytogenetics significantly.” However, whatever the precise time-scale, I am quite unable to accept that any test results carrying any weight could reasonably have been obtained by the Claimants “much earlier”, if ever. “Proper diligence” for this purpose would have involved access to significant funds, the right academic and research personnel and facilities and ready access to an appropriate cohort of veterans and an appropriate cohort of controls. Where, I ask rhetorically, were the British veterans to find the resources to pursue such a project? And how could an individual veteran

have hoped to garner material of this nature? The assertion that the Rowland study “was funded by the New Zealand Nuclear Test Veterans Association” is not wholly accurate. The study carried out by Professor Rowland and his team was at least partially funded by Governmental money. The BNTVA came close to securing the kind of assistance needed when the late Dame Catherine Cookson (see paragraph 300) provided the means for Dr Rabbitt Roff’s research, but the M-FISH technique was not available then and, judged by reference to the money needed some years later for the New Zealand research, would probably not have been sufficient to support the more extended research required. Indeed in 1999 Dr Rabbitt Roff said that £250,000 was needed to fund a programme of more sophisticated research (see paragraph 311). Her original research was, of course, of a statistical nature rather than involving any scientific analysis as such. The recommendation to which I referred in paragraph 369 was almost certainly directed towards this kind of analysis.

411. The apparent criticism of the veterans’ position made by the Defendant does have to be viewed in the context of what it would have been open to the Defendant to have done itself had it chosen to investigate matters in this kind of way. There is evidence that the late Professor H John Evans, CBE, FRSE, a distinguished cytogeneticist and Director of the Medical Research Council Human Genetics (formerly Clinical and Population Cytogenetics) Unit in Edinburgh between 1969 and 1994, had thought, at the time of “the Christmas Island publicity” (which for this purpose was, I apprehend, in late 1982 and early 1983: see paragraphs 258-262) that his unit might be asked to undertake chromosomal analysis of those who had been present at the tests. The following is a quotation from a letter from him to Dr David James at the Medical Research Council in London dated 24 January 1984, the first paragraph in that letter referring to a telephone conversation he (Professor Evans) had had with a colleague in the MRC (Diana Dunstan) “just about a year ago” about “some blood samples that we have received ... that had come from individuals who believe they had been exposed to radiation during the atom bomb tests on Christmas Island and were concerned over their health”:

“As you know, we analyse chromosomes from patients exposed to therapeutic radiation as well as those exposed occupationally whilst working at Rosyth or other industrial complexes using ionising radiations, and so it is routine for us to do a chromosome analysis on blood samples referred to us by consultants who look after people who have been exposed to radiation

At the time of the Christmas Island publicity there seemed a possibility that the MRC would be asked to investigate individuals who had been exposed during the Atom bomb tests and so I instructed my staff not to analyse slides from blood cultures from patients who were so exposed. It seemed at the time that we might well be involved in undertaking a blind analysis on random slides taken from exposed and control populations, but in the event the NRPB were asked by the Ministry of Defence to undertake an epidemiological survey of the exposed population.

Since the [MRC] were not going to be involved [I authorised the analysis of the slides we had] I had thought that it was highly unlikely that we would find any chromosome abnormalities, but it turns out that one of these patients in fact has quite a high degree of chromosome damage present in his blood cells.

... You will see from the letter relating to patient [A] that he has a not inconsiderable amount of chromosome damage present in his blood cells which would not be inconsistent with having received radiation exposure 20 or more years ago.”

412. I should, perhaps, record that there is within the papers before the Court a memorandum dated 3 October 1983 composed by Diana Dunstan (whom I believe to be Dr Diana Dunstan, who later became Director of Research Management at the Medical Research Council) recording how the NRPB became involved in the investigations following the Nationwide programmes (see paragraphs 260 and 262) and how the MRC was not invited to participate. Equally, Professor Brenner recorded in his report of 6 November 2008 that Professor Evans had said in a paper published in *Nature* in 1979 that the measurement of “lymphocyte aberration frequencies as a biological dosimeter in cases of accidental in vivo exposure to radiation” had become “standard practice”.
413. At all events, if any such analysis as that referred to in Professor Evans’ letter had been carried out on an extended basis, it would not, of course, have involved a technique as sophisticated as the M-FISH assay technique developed some 15 years or so later. However, it is at least conceivable, given the one specific result to which Professor Evans referred to in the final paragraph of his letter (see paragraph 411), that it might have opened up other lines of inquiry in relation to those who had been present at the tests. However, to put Professor Evans’ views into perspective I should refer to a letter he wrote just over 5 years later (on 19 May 1989) to Mr Jack Ashley MP, as he then was, who had raised the question of a particular technique designed to detect mutations in red blood cells, which contained the following passage:

“... I am afraid that I have to tell you that the level of detection used in this mutation system is not nearly as good as the level of detection using direct assays of chromosome damage in human white blood cells from the Atomic bomb survivors. As it stands, therefore, the red cell mutation assay can detect increased mutation frequencies in people exposed to very high doses of radiation up to many years after their exposure, but I am afraid is not sensitive enough to pick up mutations in people exposed at much lower dose levels. The most sensitive assay that we have at the moment is the chromosome aberration assay in human white cells and this can only detect levels of exposure of 10-20 rads if blood samples are taken shortly after exposure. In the case of nuclear test veterans, since exposures were usually well below the level of 10 rads, and samples can only be taken many years after exposure, there is no chance that one can detect any increased aberration frequencies in these

individuals which could be directly related to any previous radiation exposure of that sort.”

414. The implications of these two letters cannot truly be decided without the benefit of expert evidence, although, if my understanding of the conversion factors is correct (see paragraph 146), the range of 10-20 rads (the equivalent of 100-200 mSv) is broadly in the range of the median figure of exposure reconstructed for the New Zealand veterans following the Rowland study (see paragraph 425). However, what can be said for present purposes is simply that (a) it is not really appropriate for the veterans to be criticised for not pursuing chromosome analyses at an earlier stage when it would apparently have been feasible for the Defendant, through the wider Government machinery, to have done so itself rather than relying solely upon the epidemiological studies carried out by the NRPB or, on the other hand, (b) if the second letter from Professor Evans is an indication that he did not then think that “the chromosome aberration assay in human white cells” was worth pursuing for the reasons he gave, it would equally be difficult to understand why the veterans should themselves have been expected to embark on such a process at that stage.
415. Returning to the Rowland study, as a result of the M-FISH assay it emerged that the group of New Zealand veterans exhibited a frequency of total chromosome translocation (see paragraphs 154-157 above) at a rate of approximately three times that of the control group. It also emerged that a high number of cells within the veterans had complex chromosomal rearrangements (CCRs) which was taken by the authors of the report to be “an additional indicator of past radiation exposure.”
416. In relation to the conclusions to be drawn from the main results of the research (the higher translocation figures in the veterans), the authors of the report (which was accepted for publication in February 2008 in ‘Cytogenic and Genome Research’) said this:
- “The significantly higher translocation frequencies in the group of veterans compared to the controls suggests that this may be a consequence of their participation in Operation GRAPPLE However, since statistical association is not necessarily proof of a cause or relation, possible confounders need to be considered.”
417. They considered potential confounding factors and, having done so, put forward the following as their final conclusion:
- “Our analysis of potential confounding factors leads us to the view that this highly elevated frequency [i.e. total chromosome translocations] is most likely attributable to radiation exposure. Further clarification might be attained by a similar study on British and Fijian participants in Operation GRAPPLE.”
418. By reference to other studies, the authors concluded that the results of this study were “not extraordinary, despite a gap of 50 years after the initial event.”
419. As will be apparent, my task at this stage is not to make an evaluation of the true worth of the Rowland Report. My task is to consider what impact it might have on the

issue of “knowledge” (see section 16 of this judgment), the section 33 discretion if it falls to be exercised (see section 17 of this judgment) and, in the broad sense required (see paragraphs 568-569), on the merits of the cases to be advanced by the Claimants.

420. In order to put the arguments about it in context, it should be noted that Dr Darroudi, who is senior consultant on Biological Dosimetry to the International Atomic Energy Agency, UNESCO and the WHO (and who Professor Louise Parker has described as “one of the world’s leading cytogeneticists and M-FISH experts”) has raised significant issues about it and is of the view that the translocation frequency in the veteran group has been overstated, that the dose estimates given are unreliable and that the number and dispersion of unstable genetic aberrations suggests that any exposure to radiation is more recent rather than 50 years ago. Dr Lindahl (who Professor Brenner describes as “a highly respected expert in DNA repair”) has raised issues in relation to the M-FISH technique and has concluded “[on] balance ... that most of the increased ... translocation frequency ... in many of the ... veterans might have been caused by the exposure to some form of ionising radiation, or alternatively by exposure on ships to organic solvents or related chemicals that are able to cause chromosome damage”, but that it “is not possible to conclude on the balance of probabilities that a 51% or higher chance of increases in translocations were due to direct exposure to ionising radiation rather than something else, although [it] remains a possibility.”
421. Professor Brenner (who Dr Darroudi describes as “a very well respected scientist in the field of Radiation Biology and Radiation Physics”), however, considers that the technique used and the analysis undertaken was valid. He says that the M-FISH survey provides “extremely strong evidence that the nuclear test veterans have a statistically significantly increased burden of chromosome aberrations, compared to the controls.” He goes on to say that “it does not necessarily follow that all or even part of this increase was the result of radiation exposure”, but in the absence of any evidence that, for example, the naval personnel were exposed to increased levels of organic chemicals, “the most likely source of the increased chromosome aberration levels was radiation exposure”.
422. Professor Kaldor accepts that the “results of the study raise a question about the validity of the dose levels that were measured and recorded for the participants at the time of the Pacific tests.” Professor Parker and Professor Mothersill, to the extent that the study is within an area upon which each feels able to comment, also express empathy with its conclusions.
423. Professor Brenner also says this:
- “Measured excess chromosome aberrations are used ... as biomarkers of past exposure to radiation. Thus the link from the Rowland results to conclusions about human health has two steps:
- A. 1. The excess chromosome aberrations measured by Rowland ... provide evidence that the individuals have, in the past, been exposed to ionising radiation, over and above natural background

2. There is independent evidence from large-scale epidemiological studies (in particular Japanese Atomic Bomb survivors, but also nuclear workers (Cardis *et al.* 2007)) that individuals exposed to radiation doses in this dose range have an increased lifetime risk of both cancer incidence and cancer mortality. For example, atomic bomb survivors exposed in 1945 in the dose range from 5 to 150 mSv (and followed up for many decades) show statistically-significant increased risks of both cancer incidence and cancer mortality (Preston *et al.* 2003, 2004, 2007). Atomic bomb survivors who received higher doses have proportionately higher lifetime cancer risks (Preston *et al.* 2003, 2004, 2007).

B. In addition to the relevance of chromosome aberrations as biomarkers of past exposure to radiation, there is a well established mechanistic link between chromosome aberrations and cancer. In particular, the majority of all human cancers contain one or more of the same chromosomal aberrations in virtually all the tumour cells, implying that this/these chromosome aberrations must have been present in the original damaged cell(s) from which the tumour originated. This link between chromosome aberrations and cancer has been extensively catalogued It is important to emphasise here that there is no claim that the actual chromosome aberrations measured by Rowland and colleagues are themselves likely to be the originator(s) of a tumour – they are not, as they are measured in human lymphocytes, as opposed to stem cells which are likely to be the parental cells for a malignancy. Rather the chromosomal aberrations measured by Rowland and colleagues are biomarkers of past radiation exposure”

424. If it is correct to take the results of this survey as showing that the New Zealand veterans were, more likely than not, to have been exposed to ionising radiation as a result of being in the broad vicinity of the tests (and that is plainly the meaning that would have been conveyed to anyone interested in the issue), what relevance does that have to the position of the British and Fijian veterans?
425. Mr Sefton says in his statement that the 1990 report prepared by Pearce and others, to which I referred in paragraph 403 above, was “ambiguous and mirrored the 1988 NRPB study”. In one of Dr Darroudi’s reports he said that the Pearce report, based upon epidemiological studies, did not show any increased cancer incidence or mortality except in relation to leukaemia (but the latter being based on only 4 cases). That related to the New Zealand veterans. So far as the British veterans are concerned, the position taken by the Government has always been that, save in very limited respects, the exposure of those who were present at or in the vicinity of the tests was no more than the usual background exposure and, in some respects, less than that (see, e.g., paragraphs 429-430). However, the authors of the Rowland Report attempted a dose reconstruction exercise which suggested that the New Zealand naval personnel studied had been exposed to doses of between 0 mSv and 431 mSv, the median figure being 150 mSv which Dr Tomas Lindahl, who has provided reports for

the Defendant, has described as “high doses”. If Professor Mothersill’s view is correct (see paragraphs 173-180), the translocations could have been caused by “induced genomic instability following a low dose acute exposure to low LET radiation.”

426. The question, therefore, is to what extent it might be reasonable to draw inferences from this study about the exposure to radiation of others who may have been in the general vicinity of the detonations. Reproduced below is the table from the initial (not then peer-reviewed) report showing the location and yields of each Operation GRAPPLE test and the position of each ship at the time of each detonation.

	Date	Island	Height (m)	Yield	Distance from Ground Zero (Nautical Miles)	
					Pukaki	Rotoiti
1	15/05/1957	Malden	2400 m	Megaton	50	150
2	31/05/1957	Malden	2300 m	Megaton	50	150
3	19/06/1957	Malden	2300 m	Megaton	150	50
X	08/11/1957	Christmas	2250 m	Megaton	132	60
Y	28/04/1958	Christmas	2350 m	Megaton	80	-
Z1	22/08/1958	Christmas	450 m	Kiloton	28	-
Z2	02/09/1958	Christmas	2850 m	Megaton	35	-
Z3	11/09/1958	Christmas	2650 m	Megaton	35	-
Z4	23/09/1958	Christmas	450 m	Kiloton	20	-

(A ‘nautical mile’ is 1.150779 geographical miles.)

427. More specific information concerning the yields is given in paragraph 36 above. However, it is to be noted that HMNZS Pukaki, which participated on each occasion, was never closer to the point of detonation than 20 nautical miles and in most cases considerably further away. HMNZS Rotoiti was never closer than 50 nautical miles on the four occasions it participated. Whilst the distances assumed by Dr Lilley in his report of 12 November 2008 do not appear to be exactly as indicated in the table (although broadly in the same region), he is certainly of the view that no-one on either ship would have received any dose from prompt radiation, a conclusion with which, had he addressed it, I am sure Dr Regan would have agreed. The suggestion must be, therefore, that if the translocations were caused by exposure to ionising radiation at or about the time of the tests, it must have been as a result of exposure to fall-out or its longer-term consequences.
428. Many of the veterans present at the GRAPPLE tests whose cases arise for consideration in this group action were closer to ground zero than the New Zealand veterans were and, it will be argued, were more susceptible as a result to the effects of early fall-out – certainly no less susceptible. (Dr Regan says that the radiation dose rate from fall-out “depends crucially on how close the individual is to the detonation.”) Equally, it may be that a good number of the British (and maybe Fijian) veterans remained in the general area for considerably longer than their New Zealand colleagues and played a more direct role in operations (including clean-up operations) that may have exposed them to the effects of fall-out, not merely to the relatively immediate effects, but also those associated with the inhalation and ingestion of radioactive materials on a longer term basis. Whilst Mr Gibson’s written Opening

Submissions contained the proposition that “[it] has not been alleged that similar levels of translocations to those seen in the New Zealand group are present in the Claimant group”, it is difficult to see (a) how that allegation of itself could be made on scientific grounds without some kind of comparable survey of “the Claimant group” (which, of course, has not been undertaken), but (b) it is equally difficult to see what other inference is to be invited on the balance of probabilities on the basis of the matters set out above. Indeed in Response 20(a) to the Request for Further Information about the Rowland Report it is asserted on behalf of the Claimants that “it shows (on the balance of probabilities) that, despite the frequent and repeated denials of the Defendant, the New Zealand veterans (and, by extension the British, Australian and Fijian veterans) were exposed to significant ionising radiation during the tests because of the higher frequencies of chromosomal translocations compared with a non-exposed but otherwise matched group.” Whether that conclusion is drawn if any of these cases proceed to trial will be a matter for the trial judge on the basis of the evidence and argument received, but the general nature of the case that will be advanced is not that difficult to identify.

429. The reference to the position taken by the Defendant in relation to the exposure of the Claimants is summarised in Mr Crossley’s main witness statement where he says this:

“...it is important to note that the overwhelming majority of Claimant Participants received a zero dose. In fact none received a recorded dose of 200 mSv or above. Indeed on analysis of the current cohort totalling 1010 Claimants, only five Claimant Participants received over 30 mSv, the specified *lower* integrated dose limit for the tests, one of whom received 130 mSv. This was the highest dose received by any Claimant Participant.”

430. This assertion is reflected in Paragraph 34 of the Summary Defence which says that “... of the 19672 attendances by British test participants ... only 1,562 (8%) resulted in a test participant receiving a recorded non-zero dose of radiation, and only 870 (4.4%) resulted in a test participant receiving a recorded dose of over 0.99 [mSv] ...”.
431. If any trial takes place it is plain that the position said to obtain in relation to “the overwhelming majority” of the Claimants will be tested by reference, amongst other things, to the conclusions to be drawn from the Rowland Report and to the extent that those conclusions, together with other criticisms, cast doubt on the NRPB studies (see paragraphs 349-374).
432. The relevance of the report to the general limitation argument is that it is argued on behalf of all those Claimants “with knowledge of significant injury more than 3 years before issue [of proceedings]” that it was “only with the publication of [the] report that scientific evidence became available that indicated that the conditions suffered by the Veterans were attributable to exposure during the tests”: paragraph 3.4(2)(i)(h) of the Claimants’ Amended Points of Claim on Limitation served on 2 June 2008. As I have already indicated, it may also be relevant to the section 33 discretion, if it falls to be considered, in relation to those categories of Claimant *prima facie* statute-barred.
433. The Defendant has advanced the proposition that since the Rowland Report, in either its non-peer-reviewed form or its final form, did not emerge until 2007 and 2008

respectively, it cannot, as is claimed on behalf of certain Claimants, have had an impact on their decision to institute proceedings. Whilst as a matter of fact that must be so, I am not persuaded that a comment such as this really takes matters any further. In the first place, if it be the case (considered in paragraphs 514-521) that no-one could have had the relevant knowledge within the Limitation Act before the paper was first published, then no claim is statute-barred and it does not matter that the knowledge was acquired after the issue of proceedings. Second, if it be the case (considered at paragraph 517) that, until the receipt of the report, the essential case on exposure to ionising radiation was weak, then the fact that the report arguably strengthens that case considerably would be a relevant factor under section 33.

434. The true impact of the Rowland Report on the decisions made in relation to this litigation is, in my judgment, revealed by what Mr David Harris, in an unchallenged witness statement, has said. Mr Harris was one of the founding partners of Messrs Alexander Harris, the well-known firm of solicitors that merged with Messrs Irwin Mitchell in April 2006. Mr Harris had experience of multi-party or group litigation work and, as a result of some work he was conducting jointly with Mr Mervyn Fudge of Messrs Clarke Willmott, he and Mr Fudge started investigating this case. Mr Harris said that those investigations started in about April 2002, although it would seem (see paragraph 320 above) that a Mr Peter Bright of Messrs Clarke Willmott had already taken some initial steps in the process. At this stage it appears that some limited Legal Aid had been obtained to investigate the viability of bringing claims against the Defendant. As part of that overall investigatory process, Mr Harris went to Fiji and New Zealand in November/December 2002 at his own expense. He met Professor Rowland who told him that, based on preliminary findings, his eventual conclusions “may well be favourable to the veterans in challenging the existing scientific view.” Mr Harris says that Professor Rowland was not able to give him a definite view, but led him to feel confident in the eventual outcome of his investigations.
435. Mr Harris does not suggest that he had any further contact with Professor Rowland before the letter before action was sent on 15 November 2004 and when these proceedings were issued on 23 December 2004; but it seems a fair conclusion to reach that one factor, albeit certainly not the only factor, taken into account in Mr Harris’ decision-making process at the time was the indication of the possibility of some supportive scientific material from Professor Rowland.
436. At that stage, I apprehend that no veteran would have been in any better position than Mr Harris to know the significance or otherwise of Professor Rowland’s studies – indeed the veterans would not even necessarily have had the benefit of the insight that he had. It was not, as I understand it, until 2006 that further positive indications emerged from Professor Rowland’s team. The part of the Master Particulars of Claim set out in paragraph 67 above, though not referring explicitly to Professor Rowland’s report, appears to have been drafted with some knowledge of the likely findings. The *Mail on Sunday* article, to which I referred in paragraph 401 above, referred to findings said to have been related to damaged white blood cells on the part of veterans. It would seem, therefore, that at about this time the general thrust of what was likely to emerge from the New Zealand study was becoming clearer and the *Mail on Sunday* article conveyed that message. The first version of the final report was not available until 2007 and I do not think that anyone could truly have taken on board

and appreciated the meaning of this survey until that report was available. It became more authoritative, of course, when it had been peer-reviewed and published in a respected scientific journal (albeit one characterised by Dr Lindahl as “second-tier”), although in terms of the “general scientific message” of the study, that message was probably conveyed in the first version made available in 2007.

437. The Defendant’s position, of course, initially was that it did not merit particularly serious attention until it had been peer-reviewed. Indeed in a letter dated 18 June 2007 (some 9 days before he left office) the then Prime Minister, Tony Blair, said this to Dr Ian Gibson MP:

"It is too early yet to give a view on this. The evidence contained in the New Zealand study has yet to be peer-reviewed and published in the main scientific literature. We shall also wish to make our own evaluation. Until this process is complete, it will not be possible to take an informed view on whether the study has implications for the claims by nuclear test veterans for additional compensation. Indeed, the authors are at pains to stress that their study, which is about chromosomal changes, makes no claims on the health status of the veterans.

I would like to add that the Government is open to new evidence and will give very careful consideration to the study, its implications for the health of UK test veterans and our responsibilities towards them. Once the Government has formed a considered view on the New Zealand study, the Veterans Minister will write to the BNTVA on the conclusion reached."

438. On 6 November 2008 Mr Kevan Jones MP, the Minister for Veterans (the Parliamentary Under-Secretary of State for Defence), wrote to Mr John Lowe, Chairman of the BNTVA, in the following terms after a meeting:

"Turning to the Rowland cytogenetic study of a small group of New Zealand test veterans, I was pleased that everyone in the meeting was generally in agreement with me. There is no point replicating this piece of research in the UK. The Rowland Report is already on the table and any new work is not anticipated to tell us anything further about any possible link between participation in nuclear tests and subsequent ill health."

439. Mr Browne has submitted that this shows that the Government has satisfied itself as to and accepts the validity of the Rowland study. I am not sure that the letter from the Minister was quite so unequivocal in its attitude to the study, but there are, perhaps, three observations to be made:

- (i) although Professor Rowland and his colleagues ventured some hope for “a similar study on British and Fijian participants in Operation

GRAPPLE” (paragraph 417), that hope is unlikely to be realised if it is to be left to the UK Government to commission such a study;

- (ii) if it were to be contemplated, it would be a costly exercise if the New Zealand experience affords any guidance;
- (iii) whatever view may have been taken at Governmental level, the Rowland study would be susceptible of examination within the forensic processes of a trial of these claims if they took place.

440. For reasons I will summarise later (see paragraph 517), I have little doubt that the emergence of the Rowland Report did indeed represent a very significant development in the process of acquiring knowledge generally about the effects of the tests upon humans within range of those tests.

441. The impact of the report on the limitation issues is a matter I will deal with in paragraphs 514-521 (knowledge) and 624-625 (section 33).

16. The Limitation Arguments - general

442. The Defendant’s primary submission is that each of the Lead Claimants had actual knowledge of the material facts relevant to their cause of action for, in some cases, many years prior to three years before the issue of proceedings and, accordingly, their claim is statute-barred. The alternative submission is that they had constructive knowledge of relevant matters. The issues that arise in that context arise under section 14 of the Limitation Act 1980.

443. If it be the case that one or other or all of the Lead claims is thus *prima facie* statute-barred, the question arises as to whether the Court should exercise the discretion under section 33 of the Limitation Act 1980 to permit any or all of them to proceed. The Defendant submits that it would not now be just or equitable to permit these very old claims to proceed.

444. The law to be applied under the Limitation Act has been much-travelled in the authorities (see *per* Brooke LJ in *Spargo v North Essex District Health Authority* [1997] 8 Med LR 125). In an endeavour not to extend yet further what is inevitably a lengthy judgment I will confine myself largely to referring to those that seem to me to give the most authoritative contemporary guidance, but it will not be possible to avoid reference to a number of the well-known cases.

445. However, before doing so I would preface that review of the law with some general observations given the intrinsic nature of this case. The observations necessarily demand an excursion into how the legislative provisions that fall to be applied came to be enacted.

(i) The history of the 1980 Act

446. The provisions of the 1980 Act that arise for consideration were first enacted in the Limitation Act 1975. The provisions of that Act had replaced those of the Limitation Act 1963, as amended by the Law Reform (Miscellaneous Provisions) Act 1971.

447. The general problem with which each of those Acts sought to deal was that of the position of a victim of negligence or breach of statutory duty who did not know, and would have had no reason to know, that he or she had suffered injury within the limitation period. The case of *Cartledge v E. Jopling and Sons Limited* [1963] AC 758 demonstrated the injustice that this caused. At the time with which that case was concerned, the limitation period for a personal injuries claim was six years from the accrual of the cause of action, the law being that the cause of action accrued when more than minimal injury or damage was suffered by the plaintiff. (The need for “more than minimal damage” remains the criterion for the accrual of the cause of action and I will return to it at paragraphs 473-480 below.) Mr Cartledge died in England on 15 June 1957 (incidentally, four days before the GRAPPLE 3 test took place many miles away near Malden Island). The cause of his death was pneumoconiosis contracted from the inhalation prior to October 1950 of minute particles of fragmented silica dust to which he had been exposed by his employers in breach of sections 4 and 47 of the Factories Act 1937. He, and others in a similar position, did not discover that they had pneumoconiosis until after October 1950. A writ was issued on his behalf on 1 October 1956 and his employers took the point that the claim was statute-barred. Mr Cartledge had died before the trial and his widow continued the case on his behalf. The trial judge, the Court of Appeal and the House of Lords, each with regret, held that the claim was statute-barred.
448. In that case, Mr Cartledge had no knowledge, or means of knowing, that he had pneumoconiosis before the symptoms emerged. It would appear that when the symptoms did emerge, there was little difficulty in attributing the disease to the failure of his employers to take appropriate care for him. In other words, identifying the circumstances in which there was a breach of duty and how that breach of duty led to the commencement of a physical process that resulted in the emergence of pneumoconiosis in due course was an uncomplicated exercise.
449. The unjust result in that case led to the appointment of a committee under the chairmanship of Edmund-Davies J (as he then was), the terms of reference of which were “to consider and report whether any alteration is desirable in the law relating to the limitation of actions in cases of personal injury where the injury or disease giving rise to the claim has not become apparent in sufficient time to enable proceedings to be begun within three years from the inception of such injury or disease.” (1962 Cmnd. 1829).
450. The recommendations of the Committee were substantially implemented by the Limitation Act 1963, although it is clear (see paragraph 451 below) that the Act went further than the precise parameters of the recommendations advanced. The two sections that gave rise to controversy were sections 1 and 7 which, so far as relevant, were in these terms:
- “1(1) Section 2 (1) of the Limitation Act 1939 (which, in the case of certain actions, imposes a time-limit of three years for bringing the action) shall not afford any defence to an action to which this section applies, in so far as the action relates to any cause of action in respect of which - ... (b) the requirements of subsection (3) of this section are fulfilled ...

(3) The requirements of this subsection are fulfilled in relation to a cause of action if it is proved that the material facts relating to that cause of action were or included facts of a decisive character which were at all times outside the knowledge (actual or constructive) of the plaintiff until a date which - (a) either was after the end of the three-year period ... or was not earlier than 12 months before the end of that period, and (b) in either case, was a date not earlier than 12 months before the date on which the action was brought.

...

7(3) In this Part of this Act any reference to the material facts relating to a cause of action is a reference to any one or more of the following, that is to say - (a) the fact that personal injuries resulted from the negligence, nuisance or breach of duty constituting that cause of action; (b) the nature or extent of the personal injuries resulting from that negligence, nuisance or breach of duty; (c) the fact that the personal injuries so resulting were attributable to that negligence, nuisance or breach of duty, or the extent to which any of those personal injuries were so attributable.

(4) For the purposes of this Part of this Act any of the material facts relating to a cause of action shall be taken, at any particular time, to have been facts of a decisive character if they were facts which a reasonable person, knowing those facts and having obtained appropriate advice with respect to them, would have regarded at that time as determining ... that ... an action would have a reasonable prospect of succeeding and of resulting in the award of damages sufficient to justify the bringing of the action. ...

(5) ... for the purposes of this Part of this Act a fact shall, at any time, be taken to be outside the knowledge (actual or constructive) of a person if, but only if, -

(a) he did not then know the fact;

(b) in so far as that fact was capable of being ascertained by him, he had taken all such action (if any) as it was reasonable for him to have taken before that time for the purpose of ascertaining it; and

(c) in so far as there existed, and were known to him, circumstances from which, with appropriate advice, that fact might have been ascertained or inferred, he had taken all such action (if any) as it was reasonable for him to have taken before that time for the purpose of obtaining appropriate advice with respect to those circumstances.

(8) In this section appropriate advice, in relation to any fact or circumstances, means the advice of competent persons qualified ... to advise on the medical, legal and other aspects of that fact or those circumstances, as the case may be.”

451. This Act was severely criticised in the House of Lords in *Central Asbestos Co Ltd v Dodd* [1973] AC 518, leading Lord Reid to say (at p 529) that the Act “has a strong claim to the distinction of being the worst drafted Act on the statute book.” Lord Reid said that it was obvious that “one of the purposes of the Act ... was to remedy the defect in the law brought to light in *Cartledge's* case ... [but] that cannot have been the only purpose”, an observation reflected in the comment of Lord Hoffmann in *A v Hoare* [2008] 1 AC 844, 855, paragraph 19, that the legislation was “not confined to insidious diseases ... [but] to personal injuries generally.” At the time of *Dodd*, the House of Lords had to consider the issues without reference to the reports upon which legislation was based and reference to *Hansard* was not undertaken: pp. 529-530. Interestingly, when *Dodd* was considered by the Court of Appeal ([1972] 1 QB 244), Edmund-Davies LJ was a member of the court and felt entitled to say this (at p. 265):

“The committee did not, however, confine itself to “diseases,” but to all “slow manifestation” cases, thus embracing cases where a definite accident *known* to have occurred leads years later to wholly unsuspected consequences. Its report concluded (paragraph 34):

“that the law ought to be amended so that, in personal injury cases, a plaintiff should not be defeated by the expiry of the limitation period, if he satisfies the court that:

(a) the first occasion on which he discovered or could reasonably have been expected to discover *the existence of his injury, or the cause to which it was attributable*, was such that it was not reasonably practicable for him to start proceedings in time; and (b) he has in fact started proceedings within a certain period (which we consider should be 12 months) after such occasion.””

452. The point of immediate interest in that quotation is simply that the Committee perceived itself to be addressing the issue of the late emergence of an injury or its symptoms arising from “a definite accident known to have occurred”. In other words, the attributability of the disease or injury in the sense of what caused it was clearly identifiable and capable of being referable to some “definite accident” (perhaps one should add “definite state of affairs”) known to have occurred. In *Cartledge* it was the failure of the employers (who manufactured steel castings) to provide between 1939 and 1950 effective ventilation within the factory premises that materially contributed to the inhalation of the particles of silica.
453. Parliament, however, enacted the 1963 Act in the terms indicated above. It was interpreted in a number of cases by the Court of Appeal as providing that time did not run until a person knew, actually or constructively, that he or she had “a worthwhile cause of action”: see, eg, *Smith v Central Asbestos Company Limited* [1972] 1 QB 244, 258. This test was rejected by the majority in the House of Lords (Lords

Pearson, Simon and Salmon) largely on the basis that it depended significantly on the nature and quality of legal advice received by the injured person. However, the position taken by the House of Lords left the law in a state of yet further uncertainty and consequently the Law Reform Committee was invited to revisit the area. It was on the basis of that Committee's report that the 1975 Act (consolidated in the 1980 Act) was founded.

454. It is possible only to summarise the views of the Committee, but a number of matters do emerge that are worthy of note. In the first place, whilst the ultimate decision of the Committee was a retention of the actual/constructive knowledge principle (albeit recast in different statutory language) in relation to the commencement of the limitation period in personal injury cases where the injury emerged after the accrual of the cause of action, the Committee did revisit the question of whether there should be a limitation period at all in such cases. The Committee saw the argument in favour of that position as being "formidable", but also perceived the arguments on the other side also to be "formidable". Those contrary arguments were set out (at paragraph 27) as follows:

"(1) first, and perhaps foremost, most personal injury claims depend on the proof by the testimony of eye witnesses of fairly simple facts, running down actions being obvious examples. If a claim could be freely brought after the lapse of an undefined period of years, then the evidence on neither side would be likely to be reliable and injustice might be done;

(2) in spite of the fact that it is normally in the interest of a plaintiff who has a strong case to start proceedings promptly, all experience shows that plaintiffs do not start proceedings promptly unless there is a sanction for failing to do so. We have no doubt that in many cases it is consciousness that time is running against the plaintiff which makes him, and his legal advisers, press on with his claim without undue delay. We think it is in the public interest that meritorious claims should, where this is practicable, be settled at an early date and, if they cannot be settled, should come on for trial while the evidence is still fresh. If the sanction of limitation were removed, the incentive to "get on with it" would be very much weaker;

(3) in the great majority of personal injury claims, the plaintiff's ability to recover the damages due to him depends in the last resort on the defendant's being insured. The evidence we have received from insurance interests is to the effect that open-ended liability might make some risks uninsurable and this would be to the interest of nobody;

(4) a stale claim, even if hopeless, has a considerable nuisance value; there is a real need to protect potential defendants against such actions."

455. Having decided to approach the matter of limitation on the basis of the actual/constructive knowledge principle, the Committee expressed its objective as follows (at paragraph 52):

“...we have taken as our object the selection of a date of knowledge which would represent as fair a balance as is practicable in this field between the conflicting interests of the plaintiff and the defendant: the interest of the plaintiff being to recover damages, it may be for grievous and disabling injuries, which but for the defence of limitation are due to him; and the interest of the defendant being that he should not have to contest the claim after a long interval of time during which potential witnesses on his behalf may have died or disappeared and when it may be very difficult for him to check the accuracy of the plaintiffs assertion; and, in addition, that, so far as possible, there should be a fixed period of time after the lapse of which he or his insurers are entitled to close their books on any particular occurrence. This last interest of the defendant can, however, be secured only by an arbitrary long stop period which, for the reasons already given, we have rejected as a possible solution to the problem; it would not be secured by any of the three possible dates of knowledge [considered].”

456. Having decided that an open-ended solution was not appropriate, and having considered various alternatives, the Committee expressed its conclusions in relation to the issue of knowledge in the following way (at paragraph 55):

“We turn, therefore, to the third possible date of knowledge, namely the date when the plaintiff has knowledge, actual or constructive, both of his injured condition and of its having been caused by acts or omissions of the defendant. We are satisfied that this is a date capable of precise definition and not presenting any particular difficulties of proof; we are further satisfied that, in the great majority of personal injury cases (which are apt to be overlooked in the publicity inevitably attaching to exceptional cases), its selection would not involve hardship to prospective plaintiffs; but we recognise that there is likely to be a small number of cases, potentially involving very serious injuries, in which it could do so. The question then arises whether, although we have rejected discretion as a general solution to the problem of limitation in personal injury cases, there should not be vested in the courts a residual discretion, which would cover all such cases, to extend the time where, on a consideration of all the circumstances, including the respective hardships actually involved to the plaintiff if time is not extended, and to the defendant if it is, it is considered equitable to do so. The virtue of such provision is that it would enable the courts to do what the existing law does not permit, namely to investigate the actual hardships arising on each side, in the circumstances of each particular case, and to

try to strike a fair balance between them. By contrast, the major defect, as we see it, of excluding any field of discretion would be that the court could not take into account the existence, or absence, of the actual hardship. For example, the defendant's only witness as to the relevant facts may have died before the first, or may have survived until after the last, of the possible selected dates and it is therefore as likely as not that a court which has no discretion will either have to give the defendant protection against a possible event which has not happened, or to deny him protection against one that has. Equally, where the plaintiff has allowed time to run out because he has received defective advice, the court would be unable to take into account the fact that any hardship he might otherwise have suffered would be mitigated (or even eliminated) by his right to claim damages for negligence from his advisers."

457. With those principles in mind, the Committee put forward its recommendations (in paragraph 69) and formulated those recommendations in what it described as "quasi-statutory form". Whilst the language of the statute enacted thereafter differs a little in its form and presentation from that suggested by the Committee, in essence what was passed into law was what the Committee had recommended. It is those statutory provisions that have been considered extensively in various cases since then and which, of course, fall to be applied in this case.
458. My excursion into the history of the legislation has been rather lengthier than I had intended when I embarked upon it. However, as it seems to me, a number of matters may fairly be deduced from the material revealed by the exercise. In the first place, as I observed in paragraph 447 above, the whole process of reform started with the need to rectify the injustice caused when a latent injury or disease did not become manifest until after the limitation period expired, but against the background of the circumstance that when such an injury or disease did become manifest the act or omission leading to it and its attributability to that act or omission was readily identifiable. The complication of establishing a causal link between the disease or injury and the relevant act or omission did not appear to exist. The cases with which each Committee was concerned so far as actual/constructive knowledge was concerned (and the cases that led to the appointment of each Committee) were generally straightforward industrial injury claims, the only complication being the late emergence of the disease or injury. The only additional complicating matter was that of the potential claimant being given wrong medical or legal advice about the attributability of the disease or injury to the acts or omissions of the potential defendant. Section 7(5)(c) 1963 Act gave effect to the recommendation of the Edmund-Davies Committee in this regard and the philosophy of that approach was carried forward into the 1975 Act.
459. It may be thought unnecessary to state the proposition, but it is impossible to think that either Committee (or indeed Parliament when it considered the proposed statutory provisions) had in mind at the time the kind of claims raising the kind of issues, including the issues of attributability, sought to be advanced in the present case. The extent to which that has, or may have, an impact on how the issues that do arise in this

case are to be analysed by reference to those statutory provisions remains to be considered.

460. One point that it may be necessary to consider in relation to the issue of “knowledge” is the extent to which any of those present in the vicinity of any of the tests would have appreciated that any illness they subsequently developed arose from exposure to radiation arising from inhaled or ingested fall-out. In other words, how, for example, would a serviceman who developed a “significant injury” (see paragraphs 485-512) many years after his time at or near the tests have thought to himself that it might have been the consequence of eating an irradiated fish or drinking, swimming or washing in irradiated water? The obvious thought would have been that, if anything had occurred, it would have been as a result of some direct exposure from the initial blasts – a view doubtless still retained by many of those who believe they have suffered in consequence – or as a result of being on duty within the radioactive clouds formed as part of the explosions. (In a letter dated 2 September 1987 Mr McGinley wrote to the then President of the United States of America and described the BNTVA as “a group of nuclear veterans trying to obtain recognition and recompense for our illnesses and in many cases death, caused through witnessing nuclear explosions” (my emphasis). That suggests that he thought (and if he did, doubtless many others did) that it was watching the explosions that caused their subsequent problems. Similar views are reflected in paragraphs 725, 801 and 820.)
461. The difference between the position of those who may have been affected by irradiated material inhaled or ingested (about which, or the consequences of which, they almost certainly would not have known) and the position of those who worked in what they knew to have been a dusty factory (even if they did not know that the dust had the potential to cause them the long-term harm that it did) is one that needs to be considered in this context bearing in mind the mischief at which the statutory provisions were directed.
462. The second general observation to be made based upon the review of the legislative history is slightly different from the first, but to similar effect. Unlike the 1963 Act the 1975 Act provided for a residual discretion on the part of the court to disapply the limitation period in any case where it was “equitable” to do so. That provision is now to be found in section 33 of the 1980 Act. Again, whilst the Law Reform Committee and Parliament may well have had insidious (or “long maturing”: *per* Lord Diplock in *Thompson v Brown* [1981] 1 WLR 744, 747) diseases in mind when formulating the discretion, it is hard to believe that a case precisely such as the present was in contemplation. It is much more likely that attention was on far simpler personal injuries claims, the defendants to which were generally backed by insurers whose voices in the legislative process will not have been ignored. Insurers, for understandable reasons, need to know when files can be closed, make actuarial assessments of risk factors in given situations, devise investment strategies that ensure the wherewithal to meet legitimate claims when made and advise their insured on when paperwork relating to events may be destroyed. The same considerations do not arise, at least in an identical fashion, in relation to Government departments. It is, perhaps, worth recording that no Government department is mentioned as a body responding to the consultation exercise carried out by the Law Reform Committee in advance of the 1974 report (see Appendix C to the report). Most consultees were on

one side or the other of the employer/employee divide or were representatives of the insurance industry.

463. At all events, notwithstanding those general observations there is no doubt that the issues in this case have to be addressed by reference to the statutory provisions thus enacted. Indeed those provisions have had to be applied in recent years to cases involving the long-term consequences of child sex abuse going back many years, an area also probably not in the minds of the legislators at the time: see, eg, *A v Hoare* [2008] 1 AC 844 and the comments, in particular, of Baroness Hale of Richmond at paragraph 55 when she observed that “by the time the problem was recognised, some flexibility [in the law of limitation] had been introduced in personal injuries cases, albeit to meet the rather different problem of the insidious and unremarked onset of industrial disease.”
464. Statutory provisions are ordinarily “always speaking” (see, eg. *R. (on the application of Quintavalle) v Secretary of State for Health* [2003] 2 AC 687, para. 9) and, accordingly, need to be interpreted in the light of, and by reference to, the way in which contemporary issues are understood. However, whilst the notion of an “insidious and unremarked” industrial disease has a resonance with some of the issues arising in this case, it may be necessary to reflect on how provisions designed substantially for a different purpose should be applied in relation to the unique features underlying the claims in this case.
465. In *Jonathan Yearworth and others v North Bristol NHS Trust* [2009] EWCA Civ 37, in a court presided over by Lord Judge CJ and comprising Sir Anthony Clarke MR and Wilson LJ, the Court of Appeal said that the case involved “the application of common law principles to the ever-expanding frontiers of medical science.” It is at least arguable that the present case involves the application of statutory provisions within an analogous context.
466. It is necessary, in the first instance, to record the relevant statutory provisions. In short, where a claimant only acquires the relevant knowledge within three years of the commencement of the action, he or she has the right to proceed. Where that right does not exist, he or she needs a favourable exercise of the discretion conferred by section 33. It is necessary to look at the “knowledge” provisions first.

(ii) Knowledge – the statutory provisions

467. Section 11 of the Limitation Act 1980 is as follows:

(1) This section applies to any action for damages for negligence, nuisance or breach of duty (whether the duty exists by virtue of a contract or of provision made by or under a statute or independently of any contract or any such provision) where the damages claimed by the plaintiff for the negligence, nuisance or breach of duty consist of or include damages in respect of personal injuries to the plaintiff or any other person.

...

(3) An action to which this section applies shall not be brought after the expiration of the period applicable in accordance with subsection (4) or (5) below.

(4) Except where subsection (5) below applies, the period applicable is three years from —

(a) the date on which the cause of action accrued; or

(b) the date of knowledge (if later) of the person injured.

(5) If the person injured dies before the expiration of the period mentioned in subsection (4) above, the period applicable as respects the cause of action surviving for the benefit of his estate by virtue of section 1 of the Law Reform (Miscellaneous Provisions) Act 1934 shall be three years from —

(a) the date of death; or

(b) the date of the personal representative's knowledge; whichever is the later....

468. Section 12 provides as follows:

(1) An action under the Fatal Accidents Act 1976 shall not be brought if the death occurred when the person injured could no longer maintain an action and recover damages in respect of the injury (whether because of a time limit in this Act or in any other Act, or for any other reason).

...

(2) None of the time limits given in the preceding provisions of this Act shall apply to an action under the Fatal Accidents Act 1976, but no such action shall be brought after the expiration of three years from —

(a) the date of death; or

(b) the date of knowledge of the person for whose benefit the action is brought; whichever is the later.

(3) An action under the Fatal Accidents Act 1976 shall be one to which sections 28, 33 and 35 of this Act apply, and the application to any such action of the time limit under subsection (2) above shall be subject to section 39; but otherwise Parts II and III of this Act shall not apply to any such action.

469. Section 14 of the Limitation Act 1980 provides as follows:

(1) ... in sections 11 and 12 of this Act references to a person's date of knowledge are references to the date on which he first had knowledge of the following facts —

(a) that the injury in question was significant; and

(b) that the injury was attributable in whole or in part to the act or omission which is alleged to constitute negligence, nuisance or breach of duty; and

(c) the identity of the defendant; and

(d) if it is alleged that the act or omission was that of a person other than the defendant, the identity of that person and the additional facts supporting the bringing of an action against the defendant; and knowledge that any acts or omissions did or did not, as a matter of law, involve negligence, nuisance or breach of duty is irrelevant.

(2) For the purposes of this section an injury is significant if the person whose date of knowledge is in question would reasonably have considered it sufficiently serious to justify his instituting proceedings for damages against a defendant who did not dispute liability and was able to satisfy a judgment.

(3) For the purposes of this section a person's knowledge includes knowledge which he might reasonably have been expected to acquire –

(a) from facts observable or ascertainable by him; or

(b) from facts ascertainable by him with the help of medical or other appropriate expert advice which it is reasonable for him to seek; but a person shall not be fixed under this subsection with knowledge of a fact ascertainable only with the help of expert advice so long as he has taken all reasonable steps to obtain (and, where appropriate, to act on) that advice.

470. I will deal with the authorities reflecting on section 14 in paragraphs 485-512 below.

(iii) The discretion to disapply – the statutory provision

471. Section 33 is in these terms:

(1) If it appears to the court that it would be equitable to allow an action to proceed having regard to the degree to which –

(a) the provisions of section 11 ... or 12 of this Act prejudice the plaintiff or any person whom he represents; and

(b) any decision of the court under this subsection would prejudice the defendant or any person whom he represents;

the court may direct that those provisions shall not apply to the action, or shall not apply to any specified cause of action to which the action relates.

...

(2) The court shall not under this section disapply section 12(1) except where the reason why the person injured could no longer maintain an action was because of the time limit in section 11 [or subsection (4) of section 11A].

If, for example, the person injured could at his death no longer maintain an action under the Fatal Accidents Act 1976 because of the time limit in Article 29 in Schedule 1 to the Carriage by Air Act 1961, the court has no power to direct that section 12(1) shall not apply.

(3) In acting under this section the court shall have regard to all the circumstances of the case and in particular to –

(a) the length of, and the reasons for, the delay on the part of the plaintiff;

(b) the extent to which, having regard to the delay, the evidence adduced or likely to be adduced by the plaintiff or the defendant is or is likely to be less cogent than if the action had been brought within the time allowed by section 11 ... or (as the case may be) by section 12;

(c) the conduct of the defendant after the cause of action arose, including the extent (if any) to which he responded to requests reasonably made by the plaintiff for information or inspection for the purpose of ascertaining facts which were or might be relevant to the plaintiff's cause of action against the defendant;

(d) the duration of any disability of the plaintiff arising after the date of the accrual of the cause of action;

(e) the extent to which the plaintiff acted promptly and reasonably once he knew whether or not the act or omission of the defendant, to which the injury was attributable, might be capable at that time of giving rise to an action for damages;

(f) the steps, if any, taken by the plaintiff to obtain medical, legal or other expert advice and the nature of any such advice he may have received.

(4) In a case where the person injured died when, because of section 11 [or subsection (4) of section 11A], he could no longer maintain an action and recover damages in respect of the injury, the court shall have regard in particular to the length of, and the reasons for, the delay on the part of the deceased.

(5) In a case under subsection (4) above, or any other case where the time limit, or one of the time limits, depends on the date of knowledge of a person other than the plaintiff, subsection (3) above shall have effect with appropriate modifications, and shall have effect in particular as if references to the plaintiff included references to any person whose date of knowledge is or was relevant in determining a time limit.

(6) A direction by the court disapplying the provisions of section 12(1) shall operate to disapply the provisions to the same effect in section 1(1) of the Fatal Accidents Act 1976.

(7) In this section “the court” means the court in which the action has been brought.

(8) References in this section to section 11 ... include references to that section as extended by any of the preceding provisions of this Part of this Act or by any provision of Part III of this Act.

472. I will deal with the authorities on section 33 in section 17 of this judgment below.

(iv) Accrual of cause of action/‘more than minimal damage’

473. Before turning to the difficult issue of “knowledge” for the purposes of the Limitation Act, I should record briefly the position concerning the requirement for a claimant to suffer “more than minimal damage” before a cause of action in tort accrues. There is no issue between the parties as to the current state of the law.

474. “More than minimal damage” occurs (and, subject to the issue of “knowledge”, time will begin to run for the purposes of limitation) when the disease or injury produces some identifiable symptoms or physical effect. This is the effect of what was decided by the Court of Appeal in *Bolton MBC v Municipal Mutual Insurance* [2006] 1 WLR 1492, [2006] EWCA Civ 50, and there is nothing in the case of *Rothwell v Chemical & Insulating Co Ltd* [2008] 1 AC 281 (where the development of symptomless pleural plaques was held not actionable) that is inconsistent with that proposition. Given the mechanism relied upon for the injuries to health suffered by the Claimants in this case, particularly the various cancerous conditions (see paragraphs 74 and 169-170), it is worth noting how the causal mechanism of mesothelioma (itself a form of cancer of the mesothelial cells of the lungs or the abdomen), which was the subject of the *Bolton* case, was seen by the Court of Appeal in relation to the issue of when damage or injury occurs.

475. The aetiology of mesothelioma was described in the following way:

“The division of cells in human tissue is important for understanding how mesothelioma occurs. Each cell in the body contains all the genetic information necessary for the construction and functioning of the entire body. This information is contained in the form of DNA, a molecule consisting of two intertwining strands. The different structure and function of the various types of cell in the body occurs because in each cell only some of the genes contained in the DNA are active and in different cells different genes are active. The coded information in a DNA molecule is in the form of about 3,000,000,000 “base pairs”. Each pair consists of two collections of atoms called nucleotides. There is one half of each pair in each of the two intertwining strands. When cell division occurs the strands unravel and two “daughter” double helices are created. Normally the daughters are identical with each other but sometimes they are not. ... the word “mutation” [is used] for an imperfect copy. This word “mutation” thus means a thing – a cell – and not a process, and is not a synonym of “change”; for change ... the term “generic alteration” [is used]. I shall adopt this usage. The word “mutation” does not have any derogatory connotations. A mutation is different from, but not necessarily worse than, the cell from which it is

derived or otherwise undesirable. The body contains what can be described as a “repair mechanism” which sometimes corrects the discrepancy between a daughter and its parent. This repair mechanism is vital to normal health, and people whose repair system lacks some components (a very rare condition) will die early, often of cancer. Sometimes, however, a perfectly normal repair and correction mechanism fails to correct a mutation. Such failure can lead to any of three possibilities. First, the mutation may be unable to survive and die. Secondly it may be better fitted for its purpose than the cell from which it is derived, and this is the cause of evolution

It is the third possibility with which this case is concerned. A mutation which does not die, which is not repaired and which does not perform its purpose better than the cell from which it was derived may itself divide, and the “daughter” cells or (to continue the parental analogy) the grand-daughter or more distant descendants may in turn die, be repaired or be mutations from the cell from which they are derived. Eventually there may be a mutation which is malignant, i.e. a cell which divides in an uncontrolled manner, as opposed to maintaining the normal balance between cells dying and cells dividing. It normally takes a “heredity” of six or seven genetic alterations before a malignant cell occurs. The body has Natural Killer cells which, as their name indicates, can target and destroy mutations, possibly even after they have become malignant. A tumour is a growth consisting of a number of cells dividing in that uncontrolled manner. Mesothelioma is a tumour in the pleura

Asbestos fibres in the pleura increase the likelihood of genetic mutation. It is now thought likely that, if there is a series of genetic alterations which ends with a malignant cell in the pleura, fibres will have acted in causing several of those genetic alterations, rather than just one genetic alteration. However the final genetic alteration which results in a malignant cell is not necessarily caused by fibres directly. Fibres may also inhibit the activity of Natural Killer cells. Pre-cancerous genetic alterations in cells do not give rise to any symptoms or signs. They cannot be detected by any routine clinical or radiological examination. It would be possible to detect them by examining in a laboratory tissue taken from a part of the body containing cells which have become genetically modified, but the exercise would be pointless because pre-cancerous genetic alterations do not necessarily or even usually lead to mesothelioma.

It is furthermore important to note that there may be a long time lapse not only between exposure and the first formation of a malignant cell but that there may be a similarly lengthy lapse of

time between first malignancy and the onset of noticeable symptoms such as breathlessness....”

476. The argument in the case arose from a dispute between two insurers for Bolton MBC, one of the parties responsible for the exposure to asbestos of a deceased in a Fatal Accidents Act claim. The precise details of that argument are not relevant for present purposes. However, one argument advanced was that an “accidental injury” had befallen the deceased “either on inhalation of asbestos fibres or, perhaps, on the first bodily reaction to such inhalation, not at the unascertainable moment when a malignant tumour first appeared, still less when [the deceased] first felt symptoms of breathlessness and chest pain and less still when mesothelioma was itself diagnosed.” Reliance was placed “on the minuscule changes which ... preceded the genetic changes which gave rise, at a later date, to the existence of cancerous cells....” In other words, it was argued that accidental injury occurred “at the point when the body’s natural defence mechanisms were operating to destroy or neutralise the fibres as soon as they were inhaled.”
477. Longmore LJ (with whom Auld and Hallett LJ agreed) rejected that argument as “inconsistent both with principle and authority.” He said it was “inconsistent with principle because the [insurance] contract between the parties is an agreement to indemnify against liability [and it] cannot be right that, at the stage of initial exposure or initial bodily reaction to such exposure, there could be a liability on the part of [Bolton MBC] in respect of which they could require to be indemnified under any public liability insurance policy. [The deceased] could not have sued for personal injury at that stage because he had suffered no injury at that stage He was at that stage a well man, not suffering from any injury at all.” In relation to authority Longmore LJ drew attention to a number of first instance decisions and said as follows:
- “These cases have established a pattern at first instance to the effect that actionable injury does not occur on exposure or on initial bodily changes happening at that time but only at a much later date; whether that is when a malignant tumour is first created or when identifiable symptoms first occur does not matter for the purposes of this case. I would hold that these earlier cases were correctly decided and that injury cannot be equated to the “insult” received by the body when exposure first occurs.”
478. One of the decisions approved in *Bolton* was an unreported decision of McCullough J in *Guidera v NEI Projects (India) Ltd*, 17 November 1988, where it was held, in the context of an asbestosis claim, that destruction of cells was not damage or injury for the purpose of creating a cause of action.
479. It follows that where the aetiology of a relevant injury or condition is similar or analogous to, or can otherwise be equated with, the aetiology of mesothelioma, this approach to the question of when damage occurs must be followed.
480. There comes a time, not necessarily instantaneous, when symptoms are experienced in a way that makes the person suffering them appreciate that, in a colloquial sense, there is “something wrong”. That is one thing. The next matter for the purposes of

the law of limitation is the question of when that appreciation translates into “knowledge” that the symptoms are referable to an injury that “was attributable in whole or in part to the act or omission which is alleged to constitute negligence”. The words of Sir Thomas Bingham MR in *Dobbie v Medway Health Authority* [1994] 1 WLR 1234, 1240, have a bearing on this issue:

“This test is not in my judgment hard to apply. It involves ascertaining the personal injury on which the claim is founded and asking when the claimant knew of it. In the case of an insidious disease or a delayed result of a surgical mishap, this knowledge may come well after the suffering of the disease or the performance of the surgery. But more usually the claimant knows that he has suffered personal injury as soon or almost as soon as he does so.”

481. Those considerations are also relevant also to the issue of what constitutes “the injury in question” to which I will turn at paragraphs 488-497.

(v) The burden of proof on the issue of knowledge

482. I will record the position adopted by the parties to this issue. There is very little between them on it and, to the extent that there is, I do not think it makes any practical difference to the outcome of any of the Lead Cases.

483. The position taken on behalf of the Claimants is summarised in the following propositions:

(1) The legal burden of proving that personal injury occurred within 3 years of the issue of the claim form lies on the Claimant: *London Congregational Union Incorporated v Harriss & Harriss* [1988] 1 All ER 15, 29-30.

(2) Where the defendant pleads (as the Defendant does here) that a claimant had actual or constructive knowledge that he had suffered a significant injury (within s. 14(1)(a) of the Limitation Act 1980) more than 3 years before the issue of the claim form, then:-

(a) the legal burden of proving that the claimant had actual and constructive knowledge that he had suffered a significant injury more than 3 years before the date of issue of the claim form rests on the defendant: *Nash v Eli Lilly & Co.* [1993] 1 WLR 782, 785/6; *Fowell v National Coal Board* (CA), 21 May 1986, or, alternatively,

(b)(i) the legal burden of proving that the claimant did not have actual knowledge earlier than the period commencing 3 years prior to the issue of the claim form rests on the claimant; but,

(b)(ii) the legal or, alternatively, the evidential burden of proving that the claimant had constructive knowledge [within s. 14(3) of the Limitation Act 1980] that he had suffered a significant injury more than 3 years before the issue of the claim form rests on the defendant: *Furniss v Firth Brown Tools Limited* [2008] EWCA Civ 182. See also *Gascoigne v Ian Sheridan & Co.* [1995] 5 Med.

L.R. 437; *Crocker v British Coal Corpn* (1995) 29 BMLR 159, per Mance J and *Parry v Clwyd Health Authority* [1997] PIQR P1, per Colman J. followed and applied in *KR v Bryn Alyn Community Holdings Limited* [2003] 1 QB 1441, 1470 (CA).

- (3) Where the defendant pleads (as the Defendant does here) that a claimant had actual or constructive knowledge that he had suffered a significant injury that was attributable to the acts or omissions of the defendant (within section 14(1)(b) of the Limitation Act 1980) more than 3 years before the issue of the claim form, then:-
- (a) the legal burden of proving that the claimant had actual and constructive knowledge that a significant injury was attributable to the defendant's acts or omissions prior to the period commencing 3 years before the issue of the claim form rests on the defendant. Alternatively,
 - (b)(i) the legal burden of proving that the claimant did not have actual knowledge that a significant injury was attributable to the defendant's acts or omissions within 3 years of the date of issue of the claim form rests on the claimant; but,
 - (b)(ii) the legal or, alternatively, the evidential burden of proving that the claimant had constructive knowledge [within s. 14(3) of the Limitation Act 1980] that a significant injury was attributable to the defendant's acts or omissions more than 3 years before the issue of the claim form rests on the defendant.

484. For the purposes of the present proceedings, and in the light of the dicta of the Court of Appeal in *KR v Bryn Alyn Community Holdings Limited* [2003] 1 QB 1441 at para. [49], the Claimants have been prepared to accept that the legal burden is on them to satisfy the court on which date the cause of action accrued and (where later) when they acquired the relevant knowledge. However, there is an evidential burden on the Defendant to raise constructive knowledge. This is the same position taken by the Defendant, but the Claimants reserve the right to argue in the Court of Appeal that *Bryn Alyn* was wrongly decided on this point.

(vi) The authorities on the issue of 'knowledge'

485. As Mr Gibson observed, many of the authorities in this area are "fact-specific". Indeed when considering the authorities in this area (and also to some extent those concerning the causation issues), one is reminded constantly of Lord Steyn's oft-quoted observation "In law context is everything": *Regina (Daly) v Secretary of State for the Home Department* [2001] 2 A.C. 532, para. 28.

486. The most recent authoritative statement concerning the issue of what constitutes "knowledge ... that the injury in question was significant" for the purposes of section 14 is in *A v Hoare* [2008] 1 AC 844. It was, as already indicated (see paragraph 463), a case concerning the consequences of child abuse in the form of sexual assaults. Commenting on the suggestion in *McCafferty v Metropolitan Police District Receiver* [1977] 1 WLR 1073, 1081, that the test is partly subjective and partly

objective, Lord Hoffmann (with whom all their Lordships agreed save in respect of certain “nagging doubts” expressed by Baroness Hale of Richmond) said this:

“34 I respectfully think that the notion of the test being partly objective and partly subjective is somewhat confusing. Section 14(2) is a test for what counts as a significant injury. The material to which that test applies is generally "subjective" in the sense that it is applied to what the claimant knows of his injury rather than the injury as it actually was. Even then, his knowledge may have to be supplemented with imputed "objective" knowledge under section 14(3). But the test itself is an entirely impersonal standard: not whether the claimant himself would have considered the injury sufficiently serious to justify proceedings but whether he would "reasonably" have done so. You ask what the claimant knew about the injury he had suffered, you add any knowledge about the injury which may be imputed to him under section 14(3) and you then ask whether a reasonable person with that knowledge would have considered the injury sufficiently serious to justify his instituting proceedings for damages against a defendant who did not dispute liability and was able to satisfy a judgment.

35 It follows that I cannot accept that one must consider whether someone "with [the] plaintiff's intelligence" would have been reasonable if he did not regard the injury as sufficiently serious. That seems to me to destroy the effect of the word "reasonably". Judges should not have to grapple with the notion of the reasonable unintelligent person. Once you have ascertained what the claimant knew and what he should be treated as having known, the actual claimant drops out of the picture. Section 14(2) is, after all, simply a standard of the seriousness of the injury and nothing more. Standards are in their nature impersonal and do not vary with the person to whom they are applied.”

487. An injury is thus not to be regarded as significant where the claimant reasonably accepted an injury or condition of which he was aware as a fact of life or not worth bothering about: see *Dobbie v Medway Health Authority* [1994] 1 WLR 1234 *per* Sir Thomas Bingham MR at 1241-2 and *Forbes v Wandsworth Health Authority* [1997] QB 402 at 407-408.
488. Before continuing with reference to the principal authorities on the issue of “knowledge” I should address one matter of contention between the parties so far as the law is concerned, namely, how “the injury in question” should be identified for this purpose. Although Mr Gibson suggested that there was no difference between the parties on this issue, when reviewing the arguments, oral and written, this did not seem to be so.
489. The Defendant’s argument is that where a claim is made in respect of multiple injuries, time starts running as soon as the individual claimant has knowledge in respect of the first injury which could be said to be significant and capable of being

attributable to radiation, irrespective of the fact that he might learn of other injuries only much later. It is suggested that appreciation of the later injuries would be a relevant factor under section 33, but does not affect the issue of when relevant knowledge is acquired. This contention is based on *KR and others v Bryn Alyn Community Holdings Ltd* [2003] 1 QB 1441 which, it is said, was not overruled by the House of Lords in *A v Hoare* on this point. It is said that the Court of Appeal stated in terms (on the issue of the application of s.14(2) to the context of sexual abuse where there were immediate physical injuries - the so-called "impact injuries" - followed by longer term psychiatric injuries) that:

"...if the judge correctly found in the case of any claimant that he or she had the requisite knowledge within three years after majority, that knowledge would operate to bar not only the claim for damages for the immediate injuries caused by the abuse, but also the long term psychiatric injury of which he or she first acquired knowledge much later."

490. As I have indicated, it is suggested, therefore, that the first significant injury in time is the relevant one for the purpose of fixing the date of knowledge, but that this can be compensated for under section 33 if the Court thought, for example, that the Claimant's actions in delaying were reasonable.
491. From the Defendant's perspective the importance of this issue is that in some of the Lead Cases the individual Claimant is claiming for some less serious injury or condition in respect of which, it is argued, he had the requisite knowledge at a much earlier time and is also claiming for some later injury or condition (eg, in Mr Ayres' case, prostate cancer) which was diagnosed much more recently. In this situation, it is contended in effect that that the only gateway through which the Claimant could bring the later injury across the limitation threshold would be via section 33 because the relevant knowledge would have been acquired as a result of the earlier injury or condition.
492. Whilst I do not doubt that, if the analysis in the next few paragraphs is wrong, section 33 would be the appropriate means for the limitation hurdle to be overcome if it is thought right for it to be overcome, I am unable to accept that the *Bryn Alyn* case should be seen as establishing such a hard and fast principle as is suggested in those contentions and I do not think that any proposition of such an unyielding nature was intended (see paragraphs 41, 42 and 58 of the judgment). However, in the case of the kind of injury inflicted in cases of that kind, it is tolerably easy to see that ordinarily the victim would have known that he or she had been the subject of a sexual assault from the moment it happened or from the period over which a pattern of systematic abuse was perpetrated. To that extent, from the moment of his or her initial injury (which would have been significant), the limitation clock would start ticking even in respect of other significant injuries (in that case, psychological) of which he or she could not have been aware at that time. In *A v Hoare* the House of Lords has held how the later-acquired appreciation of those psychological consequences can be accommodated within the framework of the law of limitation.
493. However, that does seem very different from the situation in cases such as those involved in the present proceedings. A not wholly fanciful example, if the essential case on causation of the Claimants in this case is upheld, would be as follows: a

Christmas Island veteran is close enough to the detonation either to be affected by prompt radiation or by the immediate effects of the fall-out, perhaps by the eruption of a skin complaint. He does within 3 years of the skin complaint arising (or it would be reasonable to expect him to) attribute it to presence at or near the tests and, whilst it does represent a significant problem, he simply treats it as “one of those things” and does not issue proceedings in respect of it even though he believes (reasonably) that he could do so. At some later stage in his period on the island, he eats some locally caught fish irradiated by the fall-out from the same or another test. As a result he ingests some radioactive material with a relatively long half-life and many years later alpha or beta particles are emitted from the ingested material that have lodged within the body that trigger a process that leads to the development of a malignant tumour. With the benefit of expert help he then learns to attribute the tumour to the ingestion of radioactive materials during his presence at the tests and issues proceedings within 3 years of acquiring this knowledge.

494. Is it really to be said, in circumstances such as these, that he is to be treated as being statute-barred in relation to the tumour for the purposes of the Limitation Act because he happens to have attributed correctly the development of his skin complaint to the effects of being sufficiently close to the point of detonation?
495. I find it impossible to answer that question with a confident “yes”. One can see that various, potentially complex, questions might theoretically arise about whether there were separate causes of action in relation to the two types of injury caused in two different ways (albeit in each case by ionising radiation) – potentially by two different types of breach of duty – and a major problem would have arisen if, for example, the particular veteran had brought a claim in respect of the skin complaint which was then settled or the proceedings in respect of it brought to a conclusion by a judgment. None of these complications arise for consideration here. The issue, more simply, is whether such a veteran would be entitled to say that “the injury in question” in respect of which he now seeks to claim is the later (and thus second) emerging injury rather than the first and that the first might only be made the subject of proceedings by virtue of a favourable exercise of the discretion under section 33.
496. To my mind, there is no reason in principle why he should not do so. Whilst it must be recognised that when the shutters are brought down in some cases by the law of limitation seemingly unjust results can arise, to hold otherwise in this case in particular would offend most people’s notion of justice. I recognise that the problem could be overcome by following the route to and through section 33, but it does seem to me to require a somewhat artificial departure point for the journey. The essential scenario in the kind of situation I have identified is that the second injury is not statute-barred, but the first is. Why should the section 33 route not be the route to enable the Claimant to pursue the earlier (and first) injury if he wishes to do so many years after the event rather than, as the Defendant contends, the other way around? Unless constrained by authority to take a different view (and I do not think that *Bryn Alyn* does so constrain me) and since what is relied upon as “the injury in question” in any case is a question of fact (cf. *Snizek v Bundy (Letchworth) Limited* [2000] PIQR P213, per Judge LJ, as he then was), I would hold that the Court is entitled to examine what is claimed by the individual Claimant to be that injury. If the reality upon investigation, and in the light of the test that needs to be applied, is that an earlier injury than that claimed was treated as “significant” by the Claimant in a way that

fixes him with knowledge for the purposes of the Limitation Act then that may result in a finding that “the injury in question” is different from the one advanced. In that event, a different timescale may apply to the limitation issues. That, as it seems to me, is what the words in the Limitation Act require, rather than a rigid adherence to the proposition that the “first” injury is that which governs the issue in all circumstances. Whilst it is, with respect, relatively easy to see why that approach was considered appropriate in a case such as *Bryn Alyn*, I do not see that it amounts to a universal proposition of law or that it could have been intended to govern the position in an unusual case such as this.

497. I am alive to the proposition that when an individual Claimant ascribes a very large number of complaints which emerge at different times to presence at the tests, the factual issue of what constitutes “the injury in question” is not always straightforward. But this again seems to me to be an issue of fact to resolve in each case and one factor that needs to be considered when evaluating such a case is whether the Claimant is justified in his attribution of some or all of the conditions to the presence at the tests. At all events, that is the approach I intend to adopt because, as it seems to me, it is consistent with the structure of the Act. If I am wrong, then the section 33 route is one that will need to be considered in each case where the issue arises.
498. This conclusion on what I perceive to be the correct approach brings me back to the case of *Spargo v North Essex District Health Authority* [1997] 8 Med LR 125; [1997] PIQR P235. In that case Brooke LJ, with whom Nourse and Waller LJ agreed, reviewed a number of previous authorities (*Halford v Brooks* [1991] 1 WLR 443, *Nash v Eli Lilly & Co* [1993] 1 WLR 782, *Broadley v Guy Clapham* [1993] 4 All ER 439, *Dobbie v Medway Health Authority* [1994] 1 WLR 1234, *Smith v Lancashire Health Authority* [1995] PIQR 514 and *Forbes v Wandsworth Health Authority* [1996] 7 Med LR 175) and derived from them the following propositions:
- “(1) The knowledge required to satisfy section 14(1)(b) is a broad knowledge of the essence of the causally relevant act or omission to which the injury is attributable;
 - (2) “Attributable” in this context means “capable of being attributed to”, in the sense of being a real possibility;
 - (3) A plaintiff has the requisite knowledge when [he] knows enough to make it reasonable for [him] to begin to investigate whether or not [he] has a case against the defendant. Another way of putting this is to say that [he] will have such knowledge if [he] so firmly believes that [his] condition is capable of being attributed to an act or omission which [he] can identify (in broad terms) that [he] goes to a solicitor to seek advice about making a claim for compensation;
 - (4) On the other hand [he] will not have the requisite knowledge if [he] thinks [he] knows the acts or omissions [he] should investigate but in fact is barking up the wrong tree: or if [his] knowledge of what the defendant did or did not do is so vague or general that [he] cannot fairly be expected to know what [he] should investigate; or if [his] state of mind is such

that [he] thinks [his] condition is capable of being attributed to the act or omission alleged to constitute negligence, but [he] is not sure about this, and would need to check with an expert before [he] could be properly said to know that it was.”

499. Mr Browne and Mr Gibson do not disagree that that enunciation of the relevant principles survives subsequent cases and indeed is consistent with the opinions of their Lordships in *John Hedley Haward v Fawcetts* [2006] 1 WLR 682, HL, albeit that those opinions were expressed in the context of a professional negligence case in which the precise statutory provision under consideration was section 14A.
500. Whilst I am anxious not to engage in what Judge LJ in *Snizek* characterised as “a prolonged trawl through the authorities”, Mr Browne and Mr Gibson have drawn my attention to a good number of illustrations of how the courts have approached the two issues (albeit related issues) that lie at the heart of what I have to consider: (i) the dividing line between suspicion or belief, on the one hand, and knowledge, on the other; (ii) the way in which expert advice impinges on that issue. I cannot avoid reference to some of these cases.
501. I would start for this purpose by reference to Lord Donaldson of Lymington MR in *Halford v Brookes*, at p. 443, when he said this:
- “In this context "knowledge" clearly does not mean "know for certain and beyond possibility of contradiction." It does, however, mean "know with sufficient confidence to justify embarking on the preliminaries to the issue of a writ, such as submitting a claim to the proposed defendant, taking legal and other advice and collecting evidence." Suspicion, particularly if it is vague and unsupported, will indeed not be enough, but reasonable belief will normally suffice.”
502. That view, which is reflected in subsequent analyses of the law, does bring into relief the question of when the threshold from unsupported suspicion to reasonable belief is crossed and, of course, the issue of what constitutes a reasonable belief itself brings into focus what independent support for the belief is necessary for the belief to become “knowledge” within the Act.
503. It follows, therefore, that a significant issue in the analysis of what constitutes “knowledge” in this context is whether any Claimant in this litigation could have acquired it without having obtained expert advice, medical or scientific, irrespective of the fact that he may have persuaded himself without such advice that his illness, injury or condition had arisen because of his attendance at one or other or a number of the tests.
504. The Defendant has argued, correctly in my judgment, that once a Claimant has acquired relevant knowledge within section 14, he cannot lose it (and thus stop time running) because he receives subsequently expert advice that he is wrong. This was the conclusion of the Court of Appeal in *Nash v Eli Lilly & Co* [1993] 1 WLR 782, the case dealing with the Opren group litigation. However, this conclusion does not answer the issue identified in the preceding paragraph. The full quotation of the passage drawn to my attention by the Defendant in connection with negative advice is

worth recording (and, I would observe, it was also quoted by Bell J in his judgment in *Sniezek v Bundy (Letchworth) Limited*). The first paragraph of the quotation reflects on the case of *Davis v Ministry of Defence*, Court of Appeal (Civil Division) Transcript No.413 of 1986, which was an appeal from an order striking out the action in a case where the claimant had always believed that his dermatitis was due to his employers' fault, but he was advised by experts that this was not so. At page 795 of the judgment of the court in *Nash* (Purchas, Ralph Gibson and Mann LJJ) the following is said:

“... The decision [in *Davis*] does, however, appear to regard as arguable the contention that, if a claimant is shown to have had knowledge, as we understand the meaning of that word in this context, that his injury is attributable to the act or omission of the defendant, the subsequent obtaining of expert advice for the purpose of legal proceedings which says that the injury is not so attributable, could retrospectively cause him never to have had such knowledge. We do not accept that that contention is arguable. It seems to us to be in conflict with the words of the statute.

...

The answer to the problem, we think, is to be found in the way in which the court should, on the facts, approach and decide the question whether and when a claimant's state of mind amounted to knowledge for the purpose of sections 11 and 14 of the Act. As we have said above, whether a claimant has knowledge depends both upon the information he has received and upon what he makes of it. If it appears that a claimant, while believing that his injury is attributable to the act or omission of the defendant, realises that his belief requires expert confirmation before he acquires such a degree of certainty of belief as amounts to knowledge, then he will not have knowledge until that confirmation is obtained. Frequently, as it seems to us, it will be safe for the court to proceed upon the basis that a claimant did realise that he required confirmation if he acted in a manner consistent with that state of mind even if he is, as he may frequently be, unable to recall with any degree of precision what his state of mind was. Conclusions as to a claimant's state of mind will, we think, usually be more securely based upon inference from conduct in the known circumstances than from a claimant's later assertion as to how he now recalls his then state of mind as between, for example, belief or knowledge. We add that we have difficulty in perceiving how in any case where a claimant has sought advice and taken proceedings, it can rightly be held that the claimant had not then had relevant knowledge.”

The Court then (at page 796) put forward a series of propositions designed to assist in the resolution of the cases before it, two of which were as follows:

4. By section 14(3) "knowledge" for the purposes of section 14(1) includes knowledge reasonably expected to be acquired. There will be cases in which a firmly held belief actually held by the plaintiff precluded consideration of any further steps which he might reasonably have taken to acquire from knowledge of further facts before initiating proceedings. In other cases the state of the plaintiff's belief would make it reasonable for him to make the further inquiries envisaged in section 14(3). The temporal and circumstantial span of reasonable inquiry will depend on the factual context of the case and the subjective characteristics of the individual plaintiff involved.

5. It is to be noted that a firm belief held by the plaintiff that his injury was attributable to the act or omission of the defendant, but in respect of which he thought it necessary to obtain reassurance or confirmation from experts, medical or legal, or others, would not be regarded as knowledge until the result of his inquiries was known to him or, if he delayed in obtaining that confirmation, until the time at which it was reasonable for him to have got it. If negative expert advice is obtained, that fact must be considered in combination with all other relevant facts in deciding when, if ever, the plaintiff had knowledge. If no inquiries were made, then, if it were reasonable for such inquiries to have been made, and if the failure to make them is not explained, constructive knowledge within the terms of section 14(3) must be considered. If the plaintiff held a firm belief which was of sufficient certainty to justify the taking of the preliminary steps for proceedings by obtaining advice about making a claim for compensation, then such belief is knowledge and the limitation period would begin to run.

505. In *Sniezek v Bundy (Letchworth) Limited* [2000] PIQR P213 Simon Brown LJ, as he then was, said that "in common with Bell J, [he found] some difficulty with [the decision in *Nash*] and in particular in reconciling the first and last sentences of paragraph 5" Before dealing with that issue, Simon Brown LJ contrasted the first sentence of paragraph 5 with the earlier passage in the judgment quoted above. He continued thus:

"It seems to me likely that the court was seeking to reflect this earlier passage when it came to the first sentence of paragraph 5 of the subsequent summary. And yet, when one reaches paragraph 5, what previously had been merely a "belief" has become "a firm belief", and the earlier "expert confirmation" has become "reassurance or confirmation from experts, medical or legal, or others"."

506. *Sniezek* was a case where the claimant had a firm belief that his throat symptoms were attributable to certain dusty working conditions to which he was exposed in 1983, but having taken legal and expert medical advice was told for a good number of years that

this was not so. Notwithstanding that advice, he retained his firm belief until it was eventually confirmed by other experts in 1994. That occurred well outside the usual 3-year period. All members of the court (Simon Brown and Judge LJJ and Bell J) agreed that the claimant had relevant knowledge by much earlier than 1994. Bell J (with whom Simon Brown and Judge LJJ agreed) put the matter in this way:

“... by 1988 he was complaining of severe symptoms. He went to see his GP, complaining of his symptoms in April 1989, by which time he had suffered from throat symptoms for five years and they had continued for a year since he had stopped working in dusty conditions. He had always attributed his throat symptoms to his work alone, and I would fix his firm belief amounting to knowledge of significant injury, combined with the pre-existing knowledge of attribution of throat symptoms, at April 1989.”

507. The court was unanimous in holding that the section 33 discretion should be exercised in Mr Sniezek’s favour. However, differences of view were expressed about the correctness of *Ali v Courtaulds, Textiles Limited* [1999] Lloyd’s Med. Rep. 301 where the issue for the Claimant was whether his deafness arose from exposure to noise at work or from the natural ageing process. Judge LJ said this, agreeing with the decision in *Ali*:

“If Mr Ali did not know whether his deafness resulted from exposure to noise at work, or the natural ageing process, I find it difficult to see how he could be fixed with the necessary degree of knowledge that he had suffered an injury which was attributable to the act or omission of the defendants. He needed to “check” with, or obtain “reassurance or confirmation” from a medical expert.”

508. One feature of the *Sniezek* case that differs significantly from the present case on the issue of knowledge is that there the Claimant was always convinced from the time of working in the dusty conditions of which he complained that his problems had been caused by those conditions. In this case, there was no obvious exposure to ionising radiation at the time and it was, of course, always denied by the Ministry of Defence when it was raised years later. But it was not for many years that various veterans started putting together in their minds the thought that their problems may be associated with attendance at the tests. Whether any had the kind of conviction that Mr Sniezek had about his condition is a matter that will have to be addressed in the individual case as will the nature of any expert advice received where it was sought.
509. I do not consider that any more extensive citation of authority is going to assist my analysis further. Whilst it is possible to deduce from the authorities cited some well-established broad propositions of principle, it is by no means clear that there is always unanimity about the application of those principles in a given case. Even in what might be termed an “ordinary” case, there can be difficulties in arriving at the “right” answer in relation to the issue of knowledge. I will, I trust, be forgiven for observing that it makes the search for the “right” answer in a case such as this even more elusive.

510. In a sense, the whole process is to be likened to the placing of pieces in a jigsaw. How many pieces of the jigsaw constituting a picture of a claimant's case have to be in place before it can be said that the claimant has knowledge for the purposes of the Limitation Act? Plainly, nothing like the full picture needs to have been created nor does the picture of a cast-iron case need to have emerged. On the other hand, enough pieces have to be in place for there to be at the very least the outlines of the picture that is likely to emerge.
511. Given that the issue is primarily one of fact in each case, and that issue of fact demands at least in part an analysis of an individual's state of mind, it is important to remember that, whilst the words used by a witness when being asked about his state of mind at a particular time in the past are important, it is equally important to assess that evidence in a sensible fashion having regard to "inferences drawn from the relevant surrounding circumstances" (*per* Judge LJ in *Snizek*). In *Nash v Eli Lilly* [1993] 1 WLR 782, Purchas LJ, at 795, said as follows:
- "Conclusions as to a claimant's state of mind will, we think, usually be more securely based upon inference from conduct in the known circumstances than from a claimant's later assertion as to how he now recalls his then state of mind as between, for example, belief or knowledge."
512. In other words, the actions (or inactions) of someone at the time about which he is being asked may require the words used or accepted in evidence to be viewed with circumspection.
513. How is section 14 to be applied to the circumstances of this unique case?

(vi) the "preferred view" in this case

514. Taking the words of section 14 as they stand and asking oneself what an individual veteran would have to appreciate in order to "know" that the injury he claims to have suffered was "attributable" to the (alleged) fault of those responsible for organising the tests, it seems to me that he would need to appreciate each of the following –
- i) That the injury of which he complains is capable of being caused by radiation and by more than just background radiation, the existence of which we must all be taken to appreciate.
 - ii) That there is some credible evidence that he was exposed to ionising radiation in consequence of his time at the tests which was at a level above the ordinary background level.
515. In relation to the second of these matters, I would myself have said that, in the unique circumstances of this case, it would be necessary for the veteran, particularly though not exclusively one who was a land-based veteran at the time of the tests, to appreciate that exposure to a level of ionising radiation above background level could be caused by the inhalation or ingestion well after a detonation of material or products contaminated subsequently by fall-out. I would myself have said, given the scientific material now available and the state of the evidence presented to me, that a belief that the exposure to radiation was exposure caused by prompt radiation would have

reflected a significant misconception. It would be the equivalent of “barking up the wrong tree” in the sense of the authorities on the point.

516. As I have said, these matters would, to my mind, be the minimum necessary level of appreciation on the part of a veteran before it could fairly be said that he had knowledge of attributability of his illness or condition to his presence at the tests. It would be founded on the logic of the way in which, on the evidence available at this stage of these proceedings, the veteran’s illness, injury or condition could have arisen.
517. If this was the permitted approach to the issue, then it seems to me that the three elements could only come together in a way that constitutes knowledge for this purpose when a veteran is made aware, directly or indirectly, of the findings of the Rowland study (see paragraphs 401-441). The primary reason for saying this is that this is the first occasion when it can be said that (at least as things stand) there is credible scientific evidence of exposure to radiation to levels (a) above background levels and (b) which cause the kind of chromosomal aberrations that evidence the mechanism for at least some of the injuries or conditions of which complaint is made. Prior to the Rowland Report all the evidence raised nothing more than a suspicion of exposure to excess ionising radiation with no clear link to the conditions of which complaint is made. Indeed, of course, the NRPB reports (see paragraphs 349-375) and other studies (the New Zealand study by *Pearce* et al 1990, 1997, the Australian studies by *Donovan* et al, 1983, *Carter* et al, 2006 and *Gun* et al 2006 and the US studies by *Watanabe* et al 1995, *Johnson* et al, 1996 and *Thaul* et al 2000) suggested that majority of veterans were exposed to very low levels of radiation and that there was no proof that veterans “suffered worse health than the general population” (see paragraph 308). The NRPB reports proceeded upon the basis that generally the veterans were not exposed to ionising radiation levels above the background level.
518. I have couched the foregoing proposition in terms of when a veteran “is made aware” of the findings of the study such that, when he becomes aware of it, he acquires actual knowledge of the link between presence at the tests and illnesses that could be caused by chromosomal aberrations. The reality, of course, is that no veteran would ever have acquired this actual knowledge unless he was made aware of the views of an expert he consulted who was aware of the Rowland study and understood its implications. On that basis, actual knowledge and constructive knowledge amount to the same thing.
519. Mr Browne has submitted that there is a logical tension in the Defendant’s case on limitation in that it is contended that each individual Claimant should at the first sign of significant health effects have realised the link to the negligent acts or omissions concerning the tests such that the limitation clock started ticking, yet in the same breath it is contended that no reputable scientist then (or indeed now) could support any such link thus denying any chance of establishing liability. He has submitted that the Defendant’s argument seems to proceed on the basis that whatever the state of scientific knowledge might have been at any time as to whether any participant or veteran had been exposed to substantial ionising radiation and as to whether such exposure had the potential to cause the significant injury suffered, nonetheless if the lay participant or veteran suspected that he had been exposed to such radiation and suspected that there might be a link between such exposure and the relevant injury, then he should be fixed with actual knowledge to that effect.

520. As will be apparent, I have some considerable sympathy with that submission and that is why I would, for my part, have seen the emergence of the Rowland Report as a pivotal moment in the knowledge of anyone, expert or lay, on the crucial issues identified in paragraph 514 above.
521. The difficulty with the view that until the Rowland Report there could be no “knowledge” within the Limitation Act (which I have characterised as my “preferred view”) is that it could be said to raise the threshold of the level of appreciation of the material matters beyond that which, as I perceive them, the authorities to which I have referred would permit. Whilst it could well be said that the cases decided thus far are merely illustrations of the way section 14 is to be applied in the particular circumstances of those cases, I do not think it is open to me to take quite such a robust view. I will need to be guided by the approach in the various authorities to which I have referred. Since I must look at each Lead Case individually I think my preferred approach to the essential constituents of “knowledge” does in effect apply to some cases, but there are others where, on the facts, it cannot.

(vii) The actual view – some factors to be considered

522. Whilst I must deal with each Lead Case separately, there do seem to me to be some general factors to which I will need to have regard.
523. It is plain from a case such as *Sniezek* (see paragraphs 505-508) that a firm belief in the attributability of an injury or illness to some identifiable set of circumstances can (though not always will) amount to “knowledge” within the Limitation Act even if not supported by expert evidence. As will become apparent, on this analysis, I have felt obliged to find that in certain of the Lead Cases a sufficiently strong belief has resulted in the threshold being crossed.
524. In some cases, the taking of legal advice has been conceded as affording the existence of “knowledge” for the purposes of the Act: see, e.g., the late Mr Clark’s case at paragraphs 719-720.
525. As will have been apparent from my review of the history of the BNTVA, it has over the years encouraged its members (and others) to apply for a War Pension if the circumstances seemed appropriate (see paragraphs 277-279). Whilst I consider that a step of that nature may, depending on the circumstances, represent some movement in the direction of acquiring “knowledge” within the Act, I do not think that it follows inexorably, particularly if the application was in effect a tactical one designed to ensure a back-dating of a pension if the Government’s policy of payment in respect of a particular condition or illness changed in due course (see paragraph 277). The statutory threshold for awarding a War Pension is low and, putting it colloquially, it would be worth anyone “having a go”.

17. Section 33 – some general matters

(i) The approach

526. In so far as it is relevant, it is not in dispute that the burden of proof is on a claimant to persuade the court that it is “equitable” to disapply the time limit otherwise applicable: *Thompson v Brown* [1981] 1 WLR 744, 752, *per* Lord Diplock.

527. To what extent is the burden a “heavy burden”? In *KR v Bryn Alyn Community Holdings Limited* [2003] QB 1441 (see paragraphs 489-497 above) the Court of Appeal (at 1470) so described the burden. However, in my judgment, Mr Browne is entitled to submit that this is no longer to be regarded as the correct approach if indeed it was treated as the approach prior to the *Bryn Alyn* case.
528. In *Horton v Sadler* [2007] 1 AC 307 Lord Bingham of Cornhill (with whom all their Lordships agreed) said this (at 323-4):

“32 In resolving an application under section 33 the court must make a decision of which the inevitable effect is either to deprive the defendant of an accrued statute-bar defence or to stifle the claimant's action against the tortfeasor who caused his personal injuries. In choosing between these outcomes the court must be guided by what appears to it to be equitable, which I take to mean no more (but also no less) than fair, and it must have regard to all the circumstances of the case and in particular the six matters listed in subsection (3).”

529. In *A v Hoare* [2008] 1 AC 844 (see paragraphs 451 and 463 above) this proposition was re-emphasised. Lord Hoffmann said this (at 863):

“49 ... In *Horton v Sadler* ... the House rejected a submission that section 33 should be confined to a "residual class of cases", as was anticipated by the 20th Report of the Law Reform Committee (Cmnd 5630) (1974), at para 56. It reaffirmed the decision of the Court of Appeal in *Firman v Ellis* [1978] QB 886, holding that the discretion is unfettered. The judge is expressly enjoined by subsection (3)(a) to have regard to the reasons for delay and in my opinion this requires him to give due weight to evidence, such as there was in this case, that the claimant was for practical purposes disabled from commencing proceedings by the psychological injuries which he had suffered.

50 That, of course, is not the only matter to which he must have regard. As the Law Commission said in para 4.31 of their Report:

"We do have some concerns that claims may be brought many years after the events on which the claimant's cause of action is based, at a time when it is difficult for a fair trial to be given to the claimant's allegations. However, subject to the provision on disability, the victim is likely to have immediate knowledge of the relevant facts, so that the primary limitation period expires three years after majority. Although the court will have a discretion to disapply the primary limitation period, it must consider whether the defendant's ability to defend the claim will be prejudiced due to the lapse of time since the events giving rise to the cause of action."

51 Apart from the reference to disability, these observations seem to me as valid in relation to the exercise of the discretion under the present law as under the system proposed by the commission.”

530. There was general acceptance of this approach: see Lord Walker of Gestingthorpe at paragraph 53, Baroness Hale of Richmond at paragraph 60 and Lord Carswell at paragraph 70. Lord Brown of Eaton-under-Heywood also referred to the “unfettered” nature of the discretion (at paragraph 84) and then referred to factors that may be relevant in “the new era” being ushered in “first, by departing from *Stubbings v Webb* and, secondly, by construing section 14(2) so as to transfer from that provision to section 33 consideration of the inhibiting effect of sexual abuse upon certain victims’ preparedness to bring proceedings in respect of it.” His Lordship’s observations that followed related to sexual abuse claims and, accordingly, have no direct bearing on the issues arising in this case, but in order to reflect on the distinction between claims of that type and those made in this case, those observations should be noted:

“... a substantially greater number of allegations (not all of which will be true) are now likely to be made many years after the abuse complained of. Whether or not it will be possible for defendants to investigate these sufficiently for there to be a reasonable prospect of a fair trial will depend upon a number of factors, not least when the complaint was first made and with what effect. If a complaint has been made and recorded, and more obviously still if the accused has been convicted of the abuse complained of, that will be one thing; if, however, a complaint comes out of the blue with no apparent support for it (other perhaps than that the alleged abuser has been accused or even convicted of similar abuse in the past), that would be quite another thing. By no means everyone who brings a late claim for damages for sexual abuse, however genuine his complaint may in fact be, can reasonably expect the court to exercise the section 33 discretion in his favour. On the contrary, a fair trial (which must surely include a fair opportunity for the defendant to investigate the allegations - see section 33(3)(b)) is in many cases likely to be found quite simply impossible after a long delay.

Hitherto the misconstruction of section 14(2) has given an absolute right to proceed, however long out of time, to anyone able to say that he would not reasonably have turned his mind to litigation (more than three years) earlier It is not to be supposed that the exercise of the court’s section 33 discretion will invariably replicate that position.”

531. As I have said, those observations are directed to the kind of circumstances in which an allegation of child sexual abuse (an allegation often difficult to investigate by an institution responsible for the acts of those it employs) is made, when it is made and with what effect. It may be necessary to contrast that situation with the unique and well-chronicled events that underlie the claims sought to be advanced in this litigation: see paragraphs 572-611.

532. At all events, the recent authorities confirm that the discretion under section 33 is unfettered and, apart from the burden being on the claimant, no particular weight is attached to that burden. As Lord Bingham of Cornhill said in *Horton v Sadler* “the court must be guided by what appears to it to be ... no more (but also no less) than fair, and it must have regard to all the circumstances of the case and in particular the six matters listed in subsection (3).” That having been said, however, the longer the period of time since the material events, the higher may become the index of concern about the possibility of a fair trial in many cases. It does, it would seem, depend upon the nature of the individual case.

533. Before moving to those individual factors, it should be seen how they operate within the discretion afforded by section 33. In *Donovan v Gwentoy's Limited* [1990] 1 WLR 472, Lord Griffiths said this, referring to subsection (3):

“This subsection is not intended to place a fetter on the discretion given by subsection (1), this much is made plain by the opening words “the court shall have regard to all the circumstances of the case,” but to focus the attention of the court on matters which past experience has shown are likely to call for evaluation in the exercise of the discretion and which must be taken into consideration by the judge.”

534. The overall focus, therefore, is on all the circumstances of the case and the six factors in particular.

(ii) section 33(3)(a) – “the length of, and the reasons for, the delay on the part of the plaintiff”

535. It is not in doubt that delays before the date on which the cause of action accrued until the date on which the limitation period expired are not relevant under section 33(3)(a) (nor indeed under subsection (c)), but the whole period of delay should be taken into account as part of “all the circumstances of the case”: see *Donovan v Gwentoy's Limited* [1990] 1 WLR 472.

536. Although the principal issue in *Cain v Francis* [2008] EWCA Civ 1451 related to the issue of potential financial prejudice, the following paragraphs of the judgment of Smith LJ (with whom The Chancellor, Sir Andrew Morritt, and Maurice Kay LJ agreed) illuminate the path to be followed in connection with the issue of delay:

73. It seems to me that, in the exercise of the discretion, the basic question to be asked is whether it is fair and just in all the circumstances to expect the defendant to meet this claim on the merits, notwithstanding the delay in commencement. The length of the delay will be important, not so much for itself as to the effect it has had. To what extent has the defendant been disadvantaged in his investigation of the claim and/or the assembly of evidence, in respect of the issues of both liability and quantum? But it will also be important to consider the reasons for the delay. Thus, there may be some unfairness to the defendant due to the delay in issue but the delay may have arisen for so excusable a reason, that, looking at the matter in the round, on balance, it is fair and just that the action should proceed. On the other hand, the balance may go in the opposite direction, partly because the delay has caused procedural disadvantage and unfairness to

the defendant and partly because the reasons for the delay (or its length) are not good ones.

74. Although the delay referred to in section 33(3) is the delay after the expiry of the primary limitation period, it will always be relevant to consider when the defendant knew that a claim was to be made against him and also the opportunities he has had to investigate the claim and collect evidence: see *Gwentys*. If, as here, a defendant has had early notification of a claim and every possible opportunity to investigate and to collect evidence, some delay after the expiry of three years will have had no prejudicial effect.

537. Whilst, to the extent necessary, I will reflect on the effect of the delay after the expiration of the limitation period in those cases where it arises, the present case seems to me to be one where fine distinctions about what may or may not have occurred as a result of a particular period of delay are of far less relevance than in the ordinary run of cases. The essential question, in my view, is whether a fair trial of the primary factual issues can now take place after the overall period of time that has elapsed since the tests (see paragraphs 572-611).

538. The reasons for delaying bringing these claims are much the same in any case chosen. I have reflected on the difficulties in putting together a cohesive claim in paragraphs 345 and 409-410.

(iii) section 33(3)(b) – “the extent to which, having regard to the delay, the evidence adduced or likely to be adduced by the plaintiff or the defendant is or is likely to be less cogent than if the action had been brought within the time allowed by section 11, ... or (as the case may be) by section 12.”

539. Again, the delay referred to specifically here is the delay after the expiration of the limitation period, but the effect on the cogency of the evidence of the overall delay is something to be considered as part of “all the circumstances of the case”.

540. As will be apparent from paragraph 537 above, the overall delay seems to me to be the matter to which the most attention needs to be paid in this case.

(iv) section 33(3)(c) – “the conduct of the defendant after the cause of action arose, including the extent (if any) to which he responded to requests reasonably made by the plaintiff for information or inspection for the purpose of ascertaining facts which were or might be relevant to the plaintiff's cause of action against the defendant”

541. It is right to say that, in contrast with the factors mentioned under subsections (a) and (b), the relevant period referred to under this subsection is the period “after the cause of action arose” rather than the period after the primary limitation period expired.

542. One factor to which the Claimants draw attention in this context is the suggestion that the Defendant has throughout denied any material exposure to ionising radiation upon the basis of exposure to “prompt radiation” at the detonations with no real consideration being given to the potential longer term effects arising from fall-out. That has formed, it is argued, the basis of responses given to questions from

participants, politicians and others and the basis upon which the NRPB arrived at its conclusions. It is argued that the Rowland Report demonstrates that this approach has been “at best, misleading”.

543. For reasons I have articulated at various stages of this judgment, my task is not to decide issues of fact of that nature. However, I have concluded (see paragraph 386) that there is, on the material presently before me, a case to be answered about the extent of the monitoring in relation to alpha and beta radiation and the way the actual monitoring has fed into the NRPB studies and the responses given by the Defendant over the years.
544. I would prefer, for present purposes, to place this as a factor to be considered under “all the circumstances of the case”, but I acknowledge that it is arguably a matter that could arise under this subsection.
545. The Claimants have also made submissions about the difficulties faced in obtaining relevant documentation. There had at one stage been an allegation of deliberate concealment of documents sufficient to activate section 32 of the Limitation Act 1980, but that was expressly withdrawn in the period before this trial albeit with the suggestion that the broad issue would be raised again under section 33. Mr Crossley dealt with this allegation in some detail in his Generic Witness Statement and I received submissions from Miss Mulcahy on this matter. Mr Browne has not sought to make that much of the issue, save to suggest that the collation of relevant documentation (which, he says, may not yet be complete because there may be still yet further disclosure necessary on the substantive cases if they are permitted to proceed) has been a difficult matter for those interested in pursuing investigations into the tests.
546. For my part, I do not consider that there is any sustainable evidence of any deliberate policy of concealment of relevant documentation. On any view the documentation potentially relevant to the issues in this case is very extensive (see paragraph 582). Until proceedings are on foot there is, of course, no obligation of disclosure within the context of a legal action unless an application for pre-action disclosure has been made and has been granted. In the absence of either of those procedural situations anyone wanting documentation relating to the tests would have to seek them primarily through the Public Records Office (PRO) or by virtue of the rights conferred by the Freedom of Information Act. It is the first of those two routes that, on the evidence before me, some have attempted to follow.
547. There is in the evidence presented in these proceedings a statement from a Mr Paul Draper who undertakes research for clients. He was commissioned initially in about 1984 on behalf of the BNTVA to assist in looking at the nuclear test files at the PRO (now the National Archives) at Kew. It is, of course, there that Government documents, once they cease to be classified or otherwise protected from public disclosure, are deposited. Mr Draper’s arrangement with the BNTVA was somewhat *ad hoc* and, since he made his living out of research of this kind, he required to be paid. He did do research for the BNTVA on and off for about 13 years up to about 1997. He, of course, had experience of using the facilities at Kew and describes them at some length in his statement. I need not set out what he says in detail, but he does say that a lay person without “specialist knowledge of the Public Records Office would find it virtually impossible to fully research as extensive a subject such as

British Nuclear Weapons Testing.” That assertion has not been challenged in the proceedings before me and it has the hallmarks of a fair assessment. That was Mr Draper’s assessment based on his experience. Additionally, in the material before me, is a statement from Ms Marie-Eve von Allmen who works for Messrs Rosenblatts. She describes the present facilities for searching and retrieving documents at Kew, both online and by more traditional methods. Her statement has not been the subject of any rebuttal and I have no reason to doubt it. It merely reinforces, in my view, Mr Draper’s general assertions.

548. However, as Ms Mulcahy perfectly properly submitted, if the arrangements are not “user friendly” it is not the responsibility of the Ministry of Defence. If the Ministry of Defence has fulfilled its obligation of releasing into the public domain via the PRO documents relating to the tests, then there is no basis for saying that it has engaged in the kind of obstructive conduct envisaged under the sub-section presently being addressed.

549. To that extent, I do not consider that any difficulties that there may have been in obtaining documents that appear to be relevant to the way in which the tests were conducted can fairly be laid at the Defendant’s door. What can be said, and this seems to me to be a fully justified conclusion, is that the collation by an individual, or even a group of individuals, of all potentially relevant documentation concerning the tests from public sources would be an impossible task. In one sense, and this is merely a reflection of the view that I express elsewhere in this judgment (see paragraph 345), the only realistic way in which litigation raising the issues about conduct of the tests can be pursued is by virtue of a collective action such as this action.

550. In my judgment, therefore, there are no grounds for holding that this subsection applies to any difficulties that there may have been in securing relevant documentation. However, the overall difficulty of collecting and collating all relevant documentation concerning the tests is something that can, in my view, be put into the balance within section 33.

551. I should add, lest it be thought that I have overlooked it, that I am conscious of the Defendant’s submission that documents could have been sought from the Chairman of the Pension Appeal Tribunal (PAT) pursuant to rule 6 of the Pension Appeal Tribunal rules. I am equally conscious that it was on the basis that this avenue had not been followed by Mr McGinley and Mr Egan that their cases ultimately failed (by a narrow majority) before the European Court of Human Rights. The reason given by the Court for holding that Article 6(1) had not been breached was as follows:

“The Court considers that, in these circumstances, where a procedure was provided for the disclosure of documents which the applicants failed to utilise, it cannot be said that the State prevented the applicants from gaining access to, or falsely denied the existence of, any relevant evidence, or that the applicants were thereby denied effective access to or a fair hearing before the PAT.”

552. Simply to put that conclusion into context, the European Commission of Human Rights, in a ruling adopted on 26 November 1996, had declared as admissible the

complaints made by Mr McGinley and Mr Egan about “non-disclosure of contemporaneous records in relation to test detonations at Christmas Island in 1958” and had said the following in its reasoning:

“The Commission considers the observations of the Government ... in response to a claim question in relation to the whereabouts and date of release of the radiation level records to be reluctant and lacking in candour. The question as to when the records were released into the public domain was effectively responded to by noting that the AWE report was released in late 1993. However, the AWE report is a summary report and does not constitute or contain the original radiation level records. In light of this conclusion as to the Government’s conduct in the context of this application and in view of the matters outlined above under the heading “Relevant Background”... the Commission considers that there is a “co-existence of sufficiently strong, clear and concordant inferences” allowing it to establish that radiation level records were created, are stored at the AWE Aldermaston and have not yet been released as yet into the public domain...”

553. It is that conclusion to which I was referring in paragraphs 299 and 307 above when saying that Mr McGinley had won some support (albeit short term, as it turned out) from the European Commission of Human Rights in relation to the difficulties of obtaining documentation.
554. At all events, the short point for present purposes is that, as the European Court of Human Rights noted, there is no doubt that this avenue exists and, on the evidence before me, I accept that it does not seem to have been actively pursued. Whilst I doubt that I really have sufficient material before me to reach any very definite conclusion on the matter, I am disposed to doubt whether this really would have been a viable means of obtaining the voluminous documentation (see paragraph 582) that could be considered relevant to the conduct of the tests for the purposes of bringing an action of the nature before me.
555. Subsection (d) does not have any relevance to this case so I will move to subsection (e).

(v) section 33(3)(e) – “the extent to which the plaintiff acted promptly and reasonably once he knew whether or not the act or omission of the defendant, to which the injury was attributable, might be capable at that time of giving rise to an action for damages”

556. Whilst I am not sure that it will make any material difference to the outcome of any of the Lead Cases, I think the Claimants are correct in their submissions to contrast the wording of subsection (e) with the proviso in section 14(1). Subsection (e) refers to knowledge of the claimant that the act or omission of the defendant “might be capable of giving rise to an action for damages” whereas the proviso to section 14(1) states that “knowledge that any acts or omissions did or did not, as a matter of law, involve negligence, nuisance or breach of duty is irrelevant.” It follows, it is contended, that in order to come within subsection (e) the individual claimant must have some

knowledge that, as a matter of law, the acts and omissions of the defendant “might be capable of giving rise to an action for damages”.

557. As I have indicated, as a matter of construction I think that submission is justified. However, since I am of the view that “going it alone” against the Ministry of Defence by an individual claimant was, and always has been, at least since Legal Aid funding was unlikely to be forthcoming, an impossible task in this case, it seems to me that each individual Claimant was entitled to wait until a group action was constituted.

(vi) section 33(3)(f) – “the steps, if any, taken by the plaintiff to obtain medical, legal or other expert advice and the nature of any such advice he may have received”

558. I agree with the submission made on behalf of the Claimants that this lays down a subjective test. In other words, what did the individual claimant in fact do? The subsection does not refer to the issue of whether what was done in this regard was reasonable – that arises under subsection (e) and/or under the general circumstances of the case.
559. The issue, however, would seem to go to the overall question of whether the individual claimant has been unreasonable in delaying doing anything to progress a claim once favourable advice has been received: *Jones v G.D. Searle & Co Ltd* [1979] 1 WLR 101, 105 *per* Roskill LJ.
560. For reasons that will already be apparent (eg, paragraph 557), I do not see that this precise issue is going to impact greatly, if at all, on any of the Lead Cases.

(vii) Other circumstances

561. Various other issues have been raised from time to time in other cases that may or not have a bearing on how the discretion is to be exercised in this case. For reasons I will indicate, I consider that there are some particular (and unique) features of this case that demand consideration outside what might be termed the “usual” circumstances taken into account in a piece of personal injuries litigation (see section 18 of this judgment). However, I will reflect briefly on some of those more usual features that might have a bearing on this case.

(a) Alternative claim

562. The existence of a claim against a solicitor for “missing” issuing proceedings in time has often been taken into account in considering the question of the balance of prejudice. In *Cain’s* case (see paragraph 536), Smith LJ said this, contrasting the position of claimant and defendant:

“A claimant’s position is different. He has a substantive right, his cause of action, but he cannot proceed with it because of the operation of section 11. He has therefore been prejudiced by the loss of the right to enforce his cause of action. That prejudice is greatly reduced if he has a good claim over against his solicitor. In a case where the defendant has suffered some forensic or procedural prejudice, which will diminish his ability to defend himself, it will be relevant to consider that the claimant has another

remedy. But the fact that the claimant has a claim over will not necessarily mean that the direction [to disapply the time limit] should be refused. It might still be fair and just that the defendant remains in the frame. It is the defendant who has, *ex hypothesi*, committed the tort and ...it is his insurer who has received the premiums in respect of the relevant risk. So the fact that the claimant will not suffer financially in the end is relevant but not determinative.”

563. It is interesting to note the reference to insurance premiums (derived from something said by Lord Denning MR in *Firman v Ellis* [1978] QB 886). It reinforces the proposition that these statutory provisions have often (and correctly) been perceived as protecting not just the interests of a named individual or company against whom or which a claim is made, but his or its insurers. The position in respect of a Government department is somewhat different.
564. At all events, the issue of a claim against solicitors does not arise in any of the Lead Cases since none instructed solicitors before 2002 and, on the evidence before me, it would be difficult to see how any solicitor who failed to issue proceedings before those issued in these proceedings could have been held to have been negligent.

(b) Diversion of resources

565. The Defendant has drawn attention to comments made about the need to ensure that the discretion under section 33 is not exercised in a way that results in the wasteful diversion of resources.
566. In *Adams v Bracknell Forest Borough Council* [2005] 1 AC 76, a case involving an alleged failure by a local education authority to address the difficulties faced by a dyslexic student some 12 years before the action was commenced and where the educational records of the claimant had been destroyed, Lord Hoffmann (with whom all other members of the House agreed) said this:

“The Limitation Acts are designed to protect defendants from the injustice of having to fight stale claims especially when any witnesses the defendants might have been able to rely on are not available or have no recollection and there are no documents to assist the court in deciding what was done or not done and why A claim that the claimant's dyslexia was not diagnosed or treated many years before at school, brought long after the expiry of the limitation period, extended as it is until after the claimant's majority, will inevitably place the defendants in great difficulty in contesting it, especially in the absence of relevant witnesses and documents. The contesting of such a claim would be both expensive and likely to divert precious resources. Courts should be slow in such cases to find that the balance of prejudice is in favour of the claimant.”

567. Whilst I do not doubt that it is appropriate, in a general sense, to have regard to the expenditure of time, money and human resources in meeting claims such as those advanced in the present case, it does have to be observed that those comments were made in the context of the limited resources of a local education authority

endeavouring to continue to fulfil its statutory role at the same time as responding to a piece of litigation.

(c) The broad merits test

568. As indicated elsewhere, the overall merits of the claim is one of the factors to be taken into account under section 33. It was put thus by Stuart-Smith LJ in *Dale v British Coal Corporation* [1992] PIQR, P373, at P380-P381, a proposition substantially repeated and reflected in *Nash v. Eli Lilly & Co* [1993] 1 WLR 782, 808, and *AB v John Wyeth and Brothers Limited and ors* (1994) 5 Med LR 149:

“... where, as here, the limitation issue is tried and determined before the merits of the claim the court cannot and should not attempt to determine the merits on affidavit evidence. All that can be done and should be done is for the judge to take an overall view of the prospects of success; a judge who is experienced in this sort of litigation should have no difficulty in doing so.”

569. I hope I will be forgiven for observing, with respect, that even a judge experienced in personal injuries litigation might have some difficulty in assessing accurately the prospects of success in this particular piece of litigation: it does possess some unique features as I have already indicated. I will venture down this path as far as I perceive it necessary to go in the Lead Cases, but it is a far less straightforward path than in other cases and the views expressed necessarily more tentative than might otherwise be the case. That, I hasten to say, is not a coded message that I regard all, or any, of the cases as either obviously weak or obviously strong. All I wish to convey is that at this stage in the process, it is very much more difficult to gauge the overall strength or weakness of many of the cases than it might be in the more familiar types of personal injury case.

570. I will move from those general matters under section 33 to some particular matters potentially relevant to section 33 in this case.

18. Section 33 on this case – some potentially relevant factors

571. I have already alluded to the proposition that, whilst it will be necessary to look at each individual Lead Case separately in the context of the exercise of the section 33 discretion, there are generic factors that will have to be brought into account. This seems to me to be inescapable given the nature of the overall case sought to be advanced.

(i) The broad issue of the passage of time in relation to a fair trial and its effect on the evidence

572. A great deal is made by the Defendant about the impossibility of calling certain witnesses said to be crucial to the defence to the claims made. Mr Crossley asserts in his Generic Witness Statement that “the Defendant has suffered irrevocable prejudice, in particular because quite apart from the substantial global delay since the time of the tests, a large proportion of the Defendant’s potential witnesses died during the periods of delay” after certain dates when, it is argued, proceedings could have been triggered.

573. A huge amount of industry has gone into demonstrating that a very significant proportion of all the “core participants” in each of the tests would not be available to give evidence. These people, who number “about 100 or so” according to Mr Crossley’s statement, represent, it is said, the key individuals “who would be required to give evidence” in relation to the allegations made in the Master Particulars of Claim.
574. By way of example, in relation to the GRAPPLE Z tests it is said that there are 43 “core participants” who include –
- (i) Harold Macmillan, who was Prime Minister during the GRAPPLE tests, who died in 1986;
 - (ii) Lord Penney, Director of AWRE during the relevant period and who was responsible for all the tests (who died in March 1991);
 - (iii) a number of “policy makers” including Sir Ernest Rock Carling (who died in 1960), Professor William Mayneord (who died in 1988), Professor J. S. Mitchell (who died in 1987), Dr John Loutit (who died in 1992) and Professor Sir Ernest Titterton, Chairman of Atomic Weapons Tests Safety Committee (Australia) from 1957 (who died in 1990);
 - (iv) various individuals involved in “health physics” and/or were “senior scientists” including Sir William Cook (who died in 1987), Mr R. Pilgrim (who died in 1992), Dr David Barnes (who died in 1991), Mr Geoffrey Dale (who died in 1995), Mr William Saxby (who died in 1991) and Mr W. S. Long (who died in 2007);
 - (v) various military personnel including Lt. Col. Robert Clutterbuck (who died in 1998), Sir John Grandy, Task Force Commander (who died in 2004), Captain Roger Hicks (who died in 1987) and Captain James Western (who died in 1988).
575. I shall be referring to a number of those by name at later stages in this judgment. I have taken GRAPPLE Z merely as an example. Several of those named, of course, had been involved in other tests – indeed, in some cases, all of them – and some gave evidence to the Australian Royal Commission (see paragraphs 392-400).
576. In order to give a slightly fuller picture it needs to be noted that two individuals who might have been able to contribute to issues concerning arrangements made for decontamination and radiological protection died before anyone could reasonably have thought of pursuing a civil claim: Mr A.E. Oldbury, who was a senior scientist and a member of the GRAPPLE Z Decontamination Group, died at the age of 51 in 1965 and Air Vice Marshal Cecil Weir, GRAPPLE Air Task Commander, died aged 52 in 1965. Furthermore, there are a number, including Air Vice Marshal Barry Newton (who piloted “sniffers” and was ADC to Air Vice Marshal Oulton, Air Task Commander on GRAPPLE Y) and Dr D. G. Stevenson (officer in charge of decontamination of aircraft and who lectured the Indoctrinee Force on

decontamination) who are still alive. One person named on the list drawn up by the Defendant is Fl. Lt. John Spatcher. He is aged 76 and gave a statement to Mrs Brothers (see paragraph 659).

577. Reproduced in Appendix 1 to this judgment is the statistical analysis that reflects the outcome of the investigations carried out by the Defendant in relation to each of the tests. I will be returning to the significance of these matters below (see paragraphs 581-611).

578. Much is also made of the “guinea pig” allegation. Not surprisingly, there is a strong emotive quality about the general allegation and it provokes a strong response on behalf of the Defendant and the allegation is denied with vigour. At paragraph 12 of the Summary Defence the following is asserted:

“... at no stage were test participants or other humans used as test subjects for the purpose of discovering the biological effects of radiation, radioactive residue and fall-out products ... No human beings were ever used, or considered for use, as targets, test-subjects or “guinea-pigs” in any of the tests.”

579. Mr Crossley sets out the Defendant’s position on the prejudice it faces in this way:

“It is starkly suggested by the Claimants that those in political and military power in the UK at the time of these tests *deliberately* exposed the Claimants to doses of radiation which they knew would cause them harm in order to experiment upon them as “Guinea pigs”. This is the case that the Defendant is expected to meet 50 years later.”

580. I will return to the “guinea pig” allegation specifically at paragraphs 606-607 below, but I must address the whole issue of lack of witnesses more generally first.

581. I have no doubt that the issue of the availability of witnesses who can give oral evidence is a consideration to which attention must be paid. But how important is it in this case? Is it so weighty as to outweigh other considerations? To what extent will the lack of oral evidence unfairly prejudice the Defendant? Mr Gibson argued that “no case of this factual complexity with such serious allegations should or could be” tried substantially on the documents and argued that making “safe and fair” findings of fact would be “impossibly difficult”. The answers to the questions posed and the submissions made lie, in my view, in the unique nature of the events giving rise to the claims made.

582. The nuclear tests carried out were of enormous significance to the security of the UK and to the perceived need to arm the country with an independent nuclear capability. It would be unthinkable that the tests and all the arrangements surrounding them, both before and after each and indeed more generally, were not documented fully and meticulously: given that the tests did involve experimentation, they are likely to have been as well, if not better, documented than almost any other significant event in UK history. Indeed it is plain from such documentation as is enclosed in some of the bundles before the Court that this is so. I will summarise some of that documentation below (see paragraphs 585-602), but it is agreed by Mr Crossley that the documents

before the Court represent “a small proportion” of the documents disclosed by the Ministry of Defence in the case. As I understand it, about 12,000 documents have been disclosed (comprising about 225,000 pages), those documents, in the Ministry’s estimation on the basis of legal advice, relating to, or being potentially relevant to, the limitation issues. It appears from an answer that Mr Crossley gave to a written question put to him by the Claimants’ legal team during the proceedings that there are “over 190,000 documents in the AWE files alone” which may be potentially relevant to the claim overall, though not necessarily relevant to the limitation issue. That there is a distinction between documents relevant to the substantive claim and to the issue of limitation is evidenced by a very lengthy letter from the Treasury Solicitor to Messrs Rosenblatt dated 17 December 2008 in response to applications for specific disclosure made on behalf of the Claimants made on 5 and 8 December. It would seem, therefore, that more documents relevant to issues of breach of duty exist but have not (perfectly properly) been disclosed at the present stage of the proceedings.

583. At all events, whether or not that inference is correct, there can be no doubt that a huge volume of contemporaneous documentation relating to the tests still exists. Indeed Mr Crossley’s principal Generic Witness Statement gives clear details of the demanding process of disclosure undertaken by the Defendant. No suggestion has been made that any significant quantity of potentially relevant documentation has been destroyed or lost since the days of the tests. Again, it would be inconceivable that there should have been any wholesale loss or destruction of documentation in relation to events such as these. If any loss of documentation has occurred, it could not be alleged to be as a result of any specific delay on the part of any veteran seeking compensation.
584. Although not a point relied upon specifically by Mr Browne, it cannot be ignored that an official historian of the British nuclear weapons programmes has been appointed in the past and has written a book on the subject (see paragraph 22). Producing such an official version of the history must have involved considering many contemporaneous documents and, perhaps, discussions with those who played a part in the organisation of the tests.
585. It will be impossible to convey in this judgment the full extent of the documentation that does exist, not all of which is, in any event, within the papers before me. However, I will endeavour to give briefly a flavour of the material that is available by way of some examples from the documentation presented to me. It should be noted that most, if not all, of the reports to which I will make brief reference were not declassified until 30 years after they were produced which means that they were not released to the PRO until at least the mid-1980s.

(a) Operation HURRICANE

586. There is a report running to some 230 pages including Appendices dated 15 May 1953 (some 6-7 months after the tests). It is entitled “Draft Report of the Radiological Hazard Division”. Although described as the Draft Report, it is plain from the introductory page that the report had been “completely edited, coordinated, and revised as to subject matter but not quite so completely as to form.” It is plain that it represented the product of several months of collation and analysis of information. Given that the primary task of the Radiological Hazard Division was, it was said, “to ensure the radiological safety of all personnel taking part in the operation”, the report

reflected in very considerable detail what those responsible for the safety measures did or did not do, achieved or failed to achieve and so on in what was acknowledged to be the first “burst of [its] type” ever attempted.

587. I will say only the minimum necessary to illustrate the use to which a document like this could be put at a trial of the issue of liability, but since it deals with the planning, execution and analysis of the results of the safety policy adopted, it would be difficult to see why it would not afford a basis as it stands for the Defendant to respond to allegations of breach of duty notwithstanding the non-availability as witnesses of those who prepared it. Its principal author was Lieutenant Colonel Alec Walkling, who was the Radiation Hazards Group Leader for Operation HURRICANE. He died in February 1988, but had given evidence to the Australian Royal Commission and a transcript of his evidence is available. Another contributor to the report was Captain William Saxby who died in November 1991. Captain Saxby was a member of the Radiation Safety and Measurement Group (RH Division) and was Lieutenant Colonel Walkling’s assistant. He gave evidence to the Australian Royal Commission on the question of measures taken to guard against radiation exposure and the Commission recorded that he “gave detailed evidence ... about dosimetry and the records made”. A record of the evidence is available. (It would, perhaps, be convenient to add at this point that Captain Saxby was actively involved in the BUFFALO, ANTLER and GRAPPLE Z tests in a variety of capacities and was author of the Radiological Safety Regulations for Maralinga, 1955 and 1957. After his military career he worked at AWRE Aldermaston as Superintendent, Trials Planning Branch. One of his responsibilities was to respond to inquiries on dose records made in the course of applications to the Department of Social Security for War Disablement Pensions. An example can be seen in relation to the application made by the late Mr Clark: see paragraph 733).
588. The report also deals with certain difficulties concerning the assessment of exposure to beta radiation. I have noted in other documentation relating to Operation HURRICANE reports on the effects of fall-out through ingestion and inhalation.
589. All I would wish to say is that it is possible to see, even from a fairly cursory analysis of its contents, that the report contains material for both sides at a trial of liability. It is, of course, one document among very many others including a report dated 27 August 1954 entitled “Scientific data obtained at Operation HURRICANE”.
590. Whilst, of course, no Court would be bound by the conclusions of the Australian Royal Commission, there is no doubt that Operation HURRICANE figured largely in its consideration and a good deal of evidence and documentation was generated in relation to it at the time of the Commission hearings. Since the Government will have been defending its position in relation to this test (and indeed the others reviewed by the Commission), there can be little doubt that the views of those who planned and supervised the test will have been deployed with effect at the time. Whilst the witnesses then available will not now be available, it is difficult to see why a court now should not be able to evaluate the issues that will arise at trial at least in part by reference to what was said at the Commission hearings.

(b) Operation TOTEM

591. So far as this operation is concerned, there is a detailed “Consolidated Report” dealing with it which includes an Appendix entitled “Monitoring and Decontamination of Personnel who have worked on active aircraft”. There is also an interim report dealing with the study of the composition of long distance airborne fission products. Furthermore, there is a report prepared by Group Captain D A Wilson (Air Commodore Wilson, as he later became) of the RAF Medical Services, who flew on a Canberra aircraft through the cloud of the TOTEM 1 explosion. He was a radiologist attached to School of Radiation Medicine, AERE Harwell. (I should add that in relation to Operation MOSAIC he was responsible for devising the air sampling technique and was Air Controller of the 76 Squadron (the "sniffers"). He was also Air Controller 76 Squadron on BUFFALO and advised on facilities for GRAPPLE Z.) He died in February 1996, but his views and recollections of the personal dosimetry on TOTEM 1 as at February 1954 (the date of the report) are clear.
592. There are many other contemporaneous documents concerning the TOTEM tests and, of course, these tests were the subject of close scrutiny by the Australian Royal Commission. The comment I made about Operation HURRICANE (see paragraph 590) applies also to these tests.

(c) Operation MOSAIC

593. In relation to Operation MOSAIC there is an extensive undated post-test report detailing the preparations for the tests, their execution and the examination for contamination after they were conducted. One individual test carried out related to the examination of fish caught after the test.
594. There is a report running to some 260 pages concerning the role of HMS Diana and the effect of fall-out upon it and another report dated September 1957 detailing the measurements taken in relation to fall-out. HMS Diana was present (and Mr Hart, one of the Lead Claimants, was upon it: see paragraphs 766-791) to observe and record the fall-out and indeed to sail through it. There is a further detailed report entitled “Effect of fall out on machinery spaces” running to about 100 pages that records the observations and draws conclusions. One conclusion that might, one supposes, arguably be characterised as an admission of fact for the purposes of any future proceedings is expressed in two paragraphs that are as follows:

“Of the contamination deposited, the majority is “loose” in the sense that it can easily be inhaled as dust, or ingested via the hands and mouth. This can be a serious hazard even though the quantity is minute, far too little to show an appreciable gamma dose-rate externally.

For this type of contamination there is neither adequate detection equipment nor doctrine as to acceptable risks in service.”

595. On the basis of the way that the Claimants seek to put their case, that might well be relevant, but the point, for present purposes, is that there is a great deal of material about Operation MOSAIC and the role of HMS Diana that could, in my view, be evaluated appropriately by the trial judge.

596. Again, Operation MOSAIC was very much in focus before the Australian Royal Commission and the Government's position would have been deployed. The Task Force Commander for Operation MOSAIC, Commodore Sir Hugh Martell, who died in March 1999, gave evidence to the Commission as did Air Commodore Dennis Wilson, to whom I referred in paragraph 591 above. Although it is argued (in, for example, the case of the late Mr Brothers: see paragraphs 651-681) that their presence at a trial (along with that of others who are no longer alive) would have been essential, I cannot accept the force of that argument when there is so much written material available and, in this particular case, some of the principal players have given evidence publicly in a situation where, putting it colloquially, they would have been "defending their corner".

(d) Operation GRAPPLE

597. All the Lead Claimants (except Mr Hart) were present at, or were present in the aftermath of, at least one of the GRAPPLE tests. The Rowland Report deals with those who were in the general vicinity of the GRAPPLE tests (see paragraphs 401-441).

598. In relation to the GRAPPLE series of tests, there is a considerable amount of documentation in the bundles prepared for this hearing. It includes a lengthy technical report after the tests, but many documents evidencing what was planned including Minutes of planning meetings chaired by the Task Force Commander, Minutes of meetings concerning proposed precautions for RN personnel and decontamination arrangements, Personnel Safety Plans for each of the GRAPPLE X, Y and Z tests (three of which run to 20-30 pages and another to 11 pages) and a report on a visit to Operation GRAPPLE written by S.J. Pooley in June 1957. There is a considerable amount of documentation relating to fall-out and fall-out patterns during the operations. I have little doubt there is considerably more documentation concerning the GRAPPLE tests than is contained in the bundles presently before the Court.

599. Again, I see no basis for thinking that what was planned and executed cannot be considered and evaluated largely by reference to the substantial amount of the documentation generated at the time. These tests will have been in no different category from the others to which I have referred above save that, unlike those considered by the Australian Royal Commission, they have not been defended publicly previously. As I will observe, the opportunity to do so could have been taken at the time of the *Pearce* case (see paragraphs 326-338).

600. One of those who played a significant role in the GRAPPLE tests, having been Deputy Trial Director on the MOSAIC tests, was Mr W R J Cook (as he then was), who died in 1987. On GRAPPLE Z he was deputy to the Director AWRE, Lord Penney. Another was Captain Roger Hicks, who was Commodore Operation GRAPPLE Naval Task and who would have played a role in relation to decontamination procedures. He too died in 1987. Whilst I consider that the position in relation to these tests can be deployed adequately by reference to the contemporaneous documentation, it does have to be observed that these two men died before most of the relevant documents became declassified. Given that the *Pearce* case (see paragraphs 326-338) had been begun in 1985, it is arguably surprising that no efforts were made to obtain statements from people who would have been able to

answer the allegations about Christmas Island at the time (see paragraph 337). (This comment would apply also to Mr G C Dale to whom I referred in paragraph 574 above and to whom I will refer again in paragraph 602 below.)

601. One issue that has been raised for a number of years about GRAPPLE Y is whether the bomb detonated lower than had been intended and claimed, the assertion being made on the basis of observations of, and calculations based on, time-lapsed photographs of the explosion by a Mechanical Engineer, Mr John Large, in 1997 for the purposes of the *McGinley v UK* litigation in the European Court of Human Rights. I do not see why an issue such as this cannot be debated on the basis of all the written materials available. If the issue of fact is important, the burden of proving it will lie on the Claimants.

(e) the other tests

602. Similar reports and documents to those to which I have referred above exist relating to the BUFFALO tests (which were attended by the Indoctrinee force: see paragraphs 41-44 above) and the ANTLER tests. Those tests were, of course, the subject of consideration by the Australian Royal Commission. The Health Physics Adviser on the BUFFALO and ANTLER tests (and indeed on GRAPPLE Z) was Mr G C Dale who gave evidence before the Royal Commission.

The choice

603. The choice is, in a sense, a simple and stark one. Is it to be said that there is now no way in which there can be a fair trial in this case because most of those who planned and played a leading role in the test programme are no longer available to give evidence? Or is it to be said that a trial can take place because of the availability of the quite overwhelming amount of written material evidencing what took place which the trial judge will be able to evaluate in a way that is entirely consistent with trying fairly the issues?
604. Bearing in mind that, as in any piece of civil litigation, the burden of proof will lie upon the Claimants, I do not see why it should be said that there is now no reasonable prospect of a fair trial. In many respects this is a claim against an institution, now identified as “The Ministry of Defence”, and relates to the systems put in place by that institution at the time of the tests to secure the safety of the participants and their protection from the effects of ionising radiation. The views and positions of the institution that the Defendant now represents will be clear from the voluminous documentation available for consideration and the systems put in place are clearly and fully recorded. Indeed the views and positions of many of the significant individuals within that institution will also be clear from the same sources. Indeed some, as I have observed above, have had to defend their position before the Australian Royal Commission. What they said is on the record.
605. It is possible that in respect of a number of the issues some expert assistance will be required by the trial judge; but I do not see the assistance from contemporary experts as being invalidated merely because the papers containing scientific material, or plans based upon scientific material, were composed over 50 years ago. What was known scientifically at the time can doubtless be deduced from other contemporary sources if necessary and the practice of the day in relation, for example, to safety procedures and

so on can also be derived from contemporaneous documentation. Merely because a present-day expert was not there at the time will not necessarily undermine what he or she can contribute to the trial judge's understanding of the issues. It should also be tolerably easy to discern the true meaning of the documents from the documents themselves. Why should it be necessary for the individual who composed them to be there to explain? Whilst it will, of course, be a matter for the trial judge, but if a material part of the documentation upon which the Claimants rely is ambiguous and the ambiguity cannot be resolved by expert or other evidence, it may be that the relevant fact will not be found proved on the balance of probabilities bearing in mind where the burden of proof lies.

606. In my view, the existence of the "guinea pig" allegation, upon which the Defendant relies as a major factor in relation to the alleged prejudice of dealing with the trial without witnesses, does not undermine the general conclusion at which I have arrived. As a matter of fairness to a number amongst the Claimants, it should be noted that not all of them subscribe to the allegation in any event. Furthermore, it seems to me quite possible for the claims to be presented without having to put the case as high as suggesting a wholesale deliberate Governmental policy to expose thousands of young conscripts to unknown levels of radiation just to see what happened. As will be apparent from the earlier parts of this judgment, the case being advanced is more subtle than that and, in effect, amounts to an allegation that insufficient steps were taken to prevent exposure to ionising radiation from the effects of ingesting or inhaling materials affected by fall-out. That could, one supposes, be made part of the "guinea pig" allegation, but it does not appear to have the hallmarks of such a suggestion and Mr Browne did not seek to put it in that way in the current proceedings.
607. It may be that there are those who consider that they were "guinea pigs", but the claims can be tried without seeking to make the case on that basis. If the case is put that way, the trial judge will potentially have available the flexibility of the civil standard of proof that exists in relation to serious allegations in civil cases: cf. *Re B* [2009] 1 AC 11.
608. All those considerations go largely to evidence about the issue of the arrangements made for the safety of the participants in the tests. To what extent might consideration at trial of the issue of exposure or lack of exposure to ionising radiation be compromised by the passage of time?
609. Exposure or lack of exposure to radiation will be a matter that can be addressed in relation to most if not all Claimants by reference to the scientific evidence now in existence. Doubtless the Rowland Report and any advances upon it if any become available will play a significant part in that issue if a trial takes place. If the scientific evidence establishes that the participants were probably exposed to ionising radiation at a level above background level then, as Mr Browne has submitted, it is difficult to see why accurate and precise reconstruction of any participant's involvement or location will be necessary. The essential allegation is that the material exposure, if it occurred, arose from the effects of fall-out over the period that the men were in the areas affected by fall-out from the tests. If the Defendant's records confirm that the relevant Claimant was in one of those areas then little further inquiry would seem necessary. If the records indicated differently or there were no records, then the trial

judge would have to decide where the evidence that does exist leads. Again, it has to be remembered that the burden of proof will be on the individual Claimant.

610. Subject, therefore, to any particular consideration in an individual case, I do not see why from the Defendant's perspective a fair trial cannot take place in this case by reference substantially to the documentation created at or about the time of the tests and by reference to any statements or accounts that those involved have given subsequently. I do not see why the cogency of the evidence from the Defendant's point of view will be substantially diminished by the absence of live witnesses.
611. I would add that the Defendant's legal team produced as Appendix 3 to their written Closing Submissions a 90-page document with references designed to respond to what were said to have been inaccuracies and selective references made by Mr Browne in his opening. I make no observation, one way or the other, about whether the comments or references were or were not accurate or based on selectivity, but the fact that there is so much documentary material available to counteract them, according to the Defendant, does rather reinforce the proposition that there is ample material with which to respond to the case advanced on the Claimants' behalf.

(ii) The need for these issues to be ventilated

612. It is said on behalf of the Claimants that "[the] substantial public anxiety surrounding the tests and the public interest in these proceedings are also relevant considerations." In support of this general assertion witness statements from a prominent Member of Parliament and a well-known journalist are in the papers submitted to me.
613. That kind of assertion is always difficult to assess and Mr Browne did not make much, if anything, of it in his oral submissions. However, it is an issue that needs to be addressed.
614. Any review of the background to the issues raised in this case will demonstrate that there is ample scope for sensationalist reporting in the context of the consequences of events of the nature with which this case is concerned. There is also undeniably some scope for those with agendas other than simply wishing to see redress for veterans who believe they have suffered because of their presence at the tests to distort what happened for their own purposes. There is also a fertile ground for simple misunderstandings of the effects that presence at the tests can bring and a great deal of material upon which suspicion and conspiracy theories can be founded. It is no part of my task to try to see a way through all of this if it has occurred, merely for the moment to draw attention to how public perceptions could be distorted by these matters if a full and balanced picture is not available.
615. However, what shines through clearly and with no ambiguity on the evidence before me is that there is a large number of veterans (and their descendants) who genuinely believe that various illnesses and conditions that have beset them have arisen from their exposure to radiation at or in consequence of the tests. Many (including some of those constituting the ten Lead Cases) have suspected or believed this for a long time and have wanted the opportunity for their suspicions or beliefs to be tested independently, not necessarily with compensation as their objective. Their concerns, on the evidence of what has happened in other countries, have been mirrored by the

beliefs of others who either took part in the tests with which this case is concerned or who took part in similar tests carried out by their own countries.

616. The opportunity for an independent assessment afforded by a court trying these personal injuries claims is not a matter of gift on the part of the court. It has its own procedures, practices and the law to observe. But if there is no other venue in which an independent assessment can take place and where the competing scientific and epidemiological viewpoints can be pitted against each other, it is at least arguably a factor to be put into the balance when the discretionary exercise under section 33 falls to be considered in a unique case such as this.
617. Rather than endeavouring to evaluate the elusive concepts of “public anxiety” and “public interest” I would prefer to address the issue on the basis of what a reasonably well-informed and fair-minded layman, with an appreciation of the issues raised in these proceedings, would say. In my view, the answer would be that, all things being equal, a veteran who believes that he had an illness, injury or disability attributable to his presence at the tests whose case is supported by apparently reputable scientific and medical evidence, should be entitled to his “day in court”. That is plainly not the sole test I must apply in making any decision under section 33 nor can it possibly be an overriding factor. However, it is a factor that, in the exercise of the overall discretion within section 33, cannot be ignored completely in, as this is, a case where young servicemen, with no choice in the matter and who were in any event assured of safety, now claim to have suffered in consequence of serving in a cause designed to protect the security of their country. The same consideration must surely apply to others who played their part too and to whom a duty of care on the part of those organising the tests existed. Indeed, on one view, what they all did served a world interest, not merely a national one.

(iii) The need to avoid apparent injustice

618. Whatever view is taken of the strengths and weaknesses of an individual’s claim to a favourable exercise of the section 33 discretion, it does seem to me that one needs to have regard to the overall justice of the situation in this case – and indeed the perception of what is just. It would be the ultimate slap in the face for those veterans who genuinely believe on apparently reasonable grounds that they have a case only to be told after all these years that for some reason their case cannot proceed whilst others can. If a proper exercise of the discretion results in that consequence then, of course, it must be; but it would, in my judgment, be a very regrettable consequence.
619. Avoiding an apparent injustice such as this would, in my view, constitute a weighty factor.

(iv) The case advanced is not a new one

620. The matters to which I have referred under (i) – (iii) above are factors that in a broad sense militate in favour of permitting the cases generally to proceed notwithstanding the expiration of the limitation period where it has occurred. A factor potentially operating in a different direction is the proposition that in truth the case to be advanced now is not a new one and it could have been advanced before.
621. The Defendant quotes part of Mr Browne’s oral opening as follows:

“... the gradual production of previously classified documents together with the development of knowledge of the effects of fall-out, the extent to which it is apt to be ingested and the risks consequent upon such ingestion now afford the opportunity for nuclear physicists to reach a view as to whether there was probably potentially dangerous exposure”

622. The Defendant responds by saying that the allegations relating to fall-out were first made long ago. It is submitted that there was discussion by Professor Rotblat (see paragraph 266) about the alleged “rainout” in both the Panorama and Nationwide programmes of 1983 and attention is drawn to the way the paragraphs (i), (viii) and (ix) of the Statement of Claim in the *Pearce* case were drafted (see paragraph 330). It is argued that such allegations “formed the bedrock of” Mr Pearce’s claim and that there has been nothing to justify the delay in issuing proceedings based upon such allegations.
623. There is, of course, substance in the suggestion that a case based upon the effects of fall-out has been contemplated for many years. The Statement of Claim in the *Pearce* case could not have been drawn as it was without some expert input to that effect. Indeed it is arguable that the broad nature of “the fall-out case” had existed well before that. However, this consideration does have to be viewed against the background of the consistent stance of the Defendant that there was no general exposure to excess ionising radiation and its reliance on the epidemiological evidence of the NRPB reports that no adverse health effects could be determined amongst the veterans. Epidemiological evidence can, of course, form an important backdrop in a case such as this because it is capable of demonstrating a “general trend”: see per Lord Nicholls of Birkenhead in *Gregg v Scott* [2005] 2 AC 176, paragraph 28.
624. However, the emergence of the Rowland Report has changed the landscape significantly. If this report withstands the scrutiny to which it will doubtless be exposed in any trial, it will demonstrate the viability of “the fall-out case” in a way that could never have been advanced before (see, eg, paragraphs 428 and 517). If the advance in scientific techniques many years after material events is an insufficient factor to contribute to the exercise of a favourable discretion under section 33, then the Defendant’s argument might be sound. But I am unable to accept that this must be so. DNA profiling is now used routinely to enable long unresolved criminal cases to be brought before the courts. In many respects what has happened in this case is analogous.
625. I am certainly of the view that I must have regard to the fact that “the fall-out case” in its most general sense is one that has been available for consideration for a good while, but it cuts both ways: it could theoretically have been deployed on the Claimants’ behalf at an earlier stage, but equally the Defendant and its advisers have been well aware of it for many years and ought to have been in a position to anticipate that it would be advanced one day (as indeed it was in *Pearce*). However, the fall-out case to which I refer is the case “in its most general sense” – it would have been unspecific and largely incapable of proof until the Rowland Report emerged. That Report has, in my view, been a crucial and pivotal event in the potential deployment of a credible fall-out case and that factor of itself must weigh heavily in the scales when considering the exercise of the discretion. Generally, however, I do not find the

point made by the Defendant a particularly compelling consideration in undermining a favourable exercise of the section 33 discretion.

19. The Lead Cases

(a) ROY KEITH AYRES

626. Mr Ayres was born on 26 December 1932 and is now 76 years of age. He is very unwell, but he gave his evidence by video-link clearly and with unquestionable honesty. His case was one chosen by the Claimants.
627. In his case the deemed date of commencement of proceedings is 1 February 2007 with 1 February 2004 being the crucial date for limitation purposes. Did he have the requisite knowledge before that date? If so, what was the relevant date and what is the appropriate exercise of the discretion under section 33 if it falls to be considered?

(i) knowledge

628. The Defendant's original case was that Mr Ayres had actual and/or constructive knowledge in respect of the urticaria (a skin rash) he suffered on Christmas Island in 1957 when it occurred, a condition about which the medical officers said they did not know its cause. This was included in the Part 18 Schedule along with other matters mentioned below although Mr Ayres said he did not understand why it was included. (Its causation by ionising radiation is supported by Professor Mothersill and its abandonment for the purposes of this litigation, the Defendant suggests, reflects either a lack of faith in the expert opinion of Professor Mothersill or a strategic choice to drop this early condition for the purposes of limitation. The former is not a relevant consideration at this stage and I have dealt generally with the second assertion in paragraphs 81-85). He had suffered from osteoarthritis in the left knee from 1977 and received a diagnosis about it in 1984, cataracts starting in about 1996, haematuria (blood in the urine) in the late 1990s, prostate cancer diagnosed on 2 December 2003 and bone cancer diagnosed in February 2004 (this cancer being a secondary malignant growth arising from and parasitic upon the prostate cancer).
629. As will be apparent, this was a case, as were a number of others, in which the issue of which injury was relied upon as "the significant injury" became more refined and focused with the passage of time. At the end of the day, the issue in Mr Ayres' case is when he first had actual and/or constructive knowledge that his prostate cancer was attributable in whole or in part to exposure to radiation at Christmas Island, the Defendant accepting that he did not have actual and/or constructive knowledge in respect of his osteoarthritis until after the diagnosis of prostate cancer.
630. The primary focus, therefore, is on the question of whether he acquired the relevant knowledge on 2 December 2003 or shortly after. The Defendant contends he knew as soon as the diagnosis of prostate cancer was made that it was attributable to radiation – in other words, the suggestion is that the limitation period started on or about 2 December 2003, almost exactly 2 months before the 3-year period ending on 1 February 2007 began. The submission on behalf of Mr Ayres is that his date of knowledge occurred at some point between about mid-2004 (when he had spent time reflecting on the implications of the diagnoses of prostate and bone cancer) and 7 May 2006 when he read the *Mail on Sunday* article referred to in paragraph 401.

631. It may be thought that the issue of 2 months is, in the scale of the period of 50 years from the time of the tests, hardly worth arguing about. However, if the Defendant is right, Mr Ayres has to rely on the section 33 discretion. If he acquired the relevant knowledge at any time after 1 February 2004 then he has an absolute right to proceed subject to the “no reasonable prospect of success” argument.
632. It is necessary to trace the history a little in order to resolve this issue.
633. In June 1948 he joined the RAF as a boy entrant and qualified as an aircraft engineer fitter after 18 months training. According to his diary he left home on 26 March 1957 and after a number of flights arrived for the first time on Christmas Island on 1 April. He was there for the GRAPPLE 1-3 series of tests. The first test was on 15 May, the second on 31 May and the third on 19 June. Each was carried out on Malden Island, some 400 miles or so to the south of Christmas Island. It is not suggested that Mr Ayres was affected directly by that series of tests although he says that in his capacity as an aircraft engineer fitter he serviced the Canberra aircraft (known colloquially as “sniffers”) involved in collecting radiological data during these tests. After that series of tests was over he returned to the UK in July 1957 arriving back, according to his diary, on 21 July.
634. He returned to Christmas Island, according to his diary, almost exactly a year later in July 1958 in advance of the GRAPPLE Z series in August and September of that year. His diary contains a hand-drawn sketch of a mushroom cloud on each of 2 September, 11 September and 23 September which indeed were the dates of detonation of GRAPPLE Z/Flagpole 1, GRAPPLE Z/Halliard 1 and GRAPPLE Z/Burgee 2 as the tests were called. He arrived back in the UK after these tests on 6 October 1958. He married his wife, Anne, the following month.
635. At the time of these tests he says that he was positioned in the vicinity of the aircraft runway and told to turn his back to the detonations and to place his hands over his eyes. The detonations, he estimated, took place about 25 miles away. In his witness statement he said that once the aircraft (the “sniffers”) came back he and his colleagues would have to work quickly to prepare them for the next mission. The aircraft, he said, seemed to be in good condition when they returned, although with some condensation. He said that he was completely awestruck each time he witnessed an explosion and that it was also amazing to see the aircraft that he serviced going in to the mushroom cloud to take samples.
636. He said that after each explosion he and his colleagues soon returned to their normal activities of working hard and enjoying their leisure time including swimming, fishing, eating fish and coconuts. Although the Defendant has made the suggestion that Mr Ayres was not “exposed internally”, if this evidence is accepted at trial it would be arguable that an internal source of exposure could have existed. Mr Ayres had no recollection of having a film badge.
637. As I have indicated, he returned to the UK in October 1958 and never returned to Christmas Island. He said that it never occurred to him that he might have suffered any harm arising from his participation in the tests and it was not until years later that he began to associate certain features of his deteriorating health with his time there. He had kept a booklet given to him, he thought, when he arrived at Christmas Island entitled “Operation GRAPPLE” which contained the following paragraph:

“...no effort has been spared in the organisation of the tests to ensure the safety of personnel involved, and to obviate danger to persons and property. The arrangements made to this end will be continued throughout the operation.”

In the meantime he had continued to work for the Ministry of Defence until he retired at the age of 65. He said very clearly that he has never thought, nor had any reason to think, that he was sent out to Christmas Island as a “guinea pig”.

638. The highpoint of the Defendant’s case in relation to “knowledge” is the acceptance in cross-examination by Mr Ayres of the proposition that when the diagnosis of prostate cancer was given to him he “knew” that “there was a real possibility” that it was caused by radiation to which, by then, he thought he may have been exposed when at Christmas Island. I will examine the consequences of those words shortly, but it is right to say that prior to that time he (and, perhaps more particularly, his wife) had had some concerns about whether some of his medical problems might be associated with his time at Christmas Island. He had, understandably, been concerned about the haematuria and he accepted that, having read some newspaper articles about the BNTVA campaign, there was a possibility (though he put it no higher than that) that it was linked to his time at Christmas Island.
639. Because of Mr Ayres’ general state of mind, I think it was sensible for Mr Gibson not to submit that any medical issue that Mr Ayres experienced before the diagnosis of prostate cancer constituted a “significant injury”. Whatever words may have been put to him in cross-examination which he accepted, I think that his general state of mind before the diagnosis of prostate cancer can only be described fairly as a generalised suspicion that, for example, his haematuria might have been linked to radiation exposure. Although Mr Gibson secured the acceptance in cross-examination that he “firmly believed that [the haematuria] was capable of being blamed on the radiation” (the proposition being that he realised this when he read a particular newspaper article in December 1998), I do not think that the objective evidence from the surrounding circumstances at the time really justifies that conclusion. For example, by then he and his wife were aware of the BNTVA and yet there is no evidence that he (or she) contacted the BNTVA specifically about the haematuria. Equally, when he saw his General Practitioner on 31 December 1998 (only a few weeks after the article in the *Mail on Sunday*) there is no record of him having asked his GP whether his problems might be related to his time at Christmas Island. In those circumstances, analysed fairly, I do not think that it can be said that he had anything more than a generalised suspicion about that matter at that time. Giving to his subjective state of knowledge at the time, and anything he ought reasonably to have done to seek advice about it, the objective analysis required by *A v Hoare* (see paragraph 486), I do not consider that it can be said that he acquired “knowledge” within the Limitation Act of the attributability of his haematuria to the tests.
640. To the extent that it is relevant, there is no evidence that he ever entertained the belief (or even the suspicion) that radiation exposure could have been attributable to inhalation or ingestion of material affected by fall-out. That would also have been reasonable. However, for reasons given in paragraph 521, I do not think it is open to me to have regard to this in any event.

641. So the short issue is whether his state of mind prior to the diagnosis of prostate cancer on 2 December 2003 was such that immediately upon that diagnosis he must be treated as having acquired actual knowledge of the attributability of that condition to radiation exposure on Christmas Island.
642. I am unable to accept that, as a matter of fact, that is so or that the law demands so clear cut a conclusion. In the first place, why should Mr Ayres at that moment (assuming that he wished immediately upon diagnosis to consider the cause of the cancer) necessarily combine his past suspicions with an immediate recall of the article read some five years before linking presence at the tests with multiple myeloma, a cancer of the bone marrow? Given that he was 71 on diagnosis, the most natural immediate assumption would have been that he was just one of those unfortunate men, of whom there are many, who develop prostate cancer during their later years. With a clear mind, it might well have taken anyone some time to start piecing the personal jigsaw together with the eventual attribution of the condition to what happened at the tests. However, Mr Ayres, when confronted with the diagnosis, was also confronted with some very difficult and sensitive treatment choices upon which I will not dwell in this public judgment. Suffice it to say, that I cannot believe that he, or anyone in his position would have been troubling to think about the cause of what he was facing at that time when the whole focus was on how to deal with it. I should say that, having reviewed his medical records for that period, there is no record of him having raised with his General Practitioner or the Consultant who was seeing him at the time the question of any causal connection between the cancer and the Christmas Island tests. I cannot believe that any analysis involving the concept of the “reasonable person” possessed of the information at, and reasonably at, his disposal at the moment of diagnosis would result in a different conclusion.
643. The same applies to the time of his diagnosis on 16 February 2004 of “metastatic prostate cancer with multiple metastases in the axial skeleton.” Mr Ayres said in his evidence, and I accept it fully, that he realised that the situation was very serious when that diagnosis was made.
644. In my view, it would have been perfectly reasonable for anyone in Mr Ayres’ position to take time to digest the consequences of the diagnosis that was first made in December 2003 and then supplemented in February 2004. In fact he did nothing about it until after he had seen the *Mail on Sunday* article referred to in paragraph 401 above and then contacted Messrs Rosenblatts. That article effectively indicated what the Rowland study would conclude although it made no direct reference to prostate cancer. If my preferred view on how the question of knowledge should be approached (see paragraphs 514-521) applied, the limitation period would not have started at least until he had seen that article and, I would add, had made contact with the solicitors to ask for further information. However, since I do not feel able to go that far on the authorities, I would agree that Mr Browne is justified in saying that Mr Ayres’ knowledge should be taken as having been acquired at some time between the middle of 2004 and when he read that article. I conclude this because, given his previous suspicions, it would have been reasonable for him to seek expert confirmation of the potential linkage between his prostate and bone cancer and exposure to ionising radiation. On the basis that he ought reasonably to have done that at some stage during this period, I think it must be said that he acquired constructive knowledge during it. However, it does not matter very much for

practical purposes. My conclusion is that he did not possess relevant knowledge until after 1 February 2004 and, accordingly, his claim is not statute-barred.

(ii) section 33

645. If I am wrong about the foregoing and Mr Ayres' date of knowledge was December 2003, the Defendant recognises that the delay in his case "is only a matter of months longer than the three years that the Limitation Act allows."
646. Whilst points are made by the Defendant in relation to no adequate explanation for the delay in issuing proceedings having been given, I do not think that such criticisms withstand the chronology of his developing difficulties and concerns about how to deal with them. I do not see how it could be said to be unreasonable in those circumstances not to have done anything until reading *The Mail on Sunday* article in May 2006.
647. The Defendant has made a strong submission that Mr Ayres' case cannot succeed on causation grounds. It is said that the only support comes from Professor Mothersill and all she has said is that "exposure to ionising radiation materially increased the risk of Mr. Ayres developing prostate cancer ...". I do not think it is quite right to say that the only support comes from Professor Mothersill. Professor Parker has said that the evidence as reported in UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation) 2006 is equivocal since there are some studies which suggest there may be a relation between prostate cancer and exposure to ionising radiation, but the evidence is not conclusive and UNSCEAR concludes that overall there is little evidence supportive of an association. The Radiation Effects Research Foundation (RERF), she says, suggests that the association between radiation and prostate cancer is weak. Professor Kaldor has said that "[based] on the best available scientific information, ionising radiation has not been consistently found to be a cause of prostate cancer." It is not suggested by either Professor Parker or Professor Kaldor that the link is non-existent, though it has to be acknowledged, on the basis of the present evidence, it is weak.
648. For reasons I have given elsewhere (see section 14 of this judgment) I have not been prepared to strike out any of the claims as "doomed to fail" on the issue of causation. Given the expert views as they stand Mr Ayres' causation case is arguable, but by no means strong. In addition to the difficulties of demonstrating an association between radiation and prostate cancer he may face the difficulty of establishing that it was not more likely to have arisen spontaneously given his age rather than as a result of exposure to ionising radiation.
649. However, this assessment of the merits of this issue would not have impelled me to say that it outweighed the other factors militating in favour of a trial, those being set out in paragraphs 572-625 above.
650. Mr Ayres was present during the GRAPPLE series of tests. For reasons I have summarised above (see paragraphs 597-601), I do not see why the Defendant cannot respond to any case advanced on Mr Ayres' behalf in relation to exposure. Indeed, based upon a report entitled "Environmental Monitoring at Christmas Island 1957 – 1958" by Clare, Woods, Woodville and Harrison, it is said in Mr Crossley's Generic Witness Statement that a "comprehensive environmental radiological monitoring

programme demonstrates that there was essentially no significant detectable increase in radioactivity from fall-out directly attributable to the GRAPPLE tests”. If that is the Defendant’s response to this claim, it seems that the material is there to respond to it.

(b) JOHN ALLEN BROTHERS, deceased

651. The late Mr Brothers was born on 20 May 1933 and died on 13 June 2000 at the age of 67. Evidence was given in the case brought on behalf of his estate and as his dependant by his widow, Mrs Wendy Brothers. Mrs Brothers is now aged 70. She gave evidence before me. She was an entirely honest and open witness whose evidence I accept entirely subject only to the vagaries of memory that affect everyone. Quite understandably, she was devastated by her husband’s premature death.

652. This case was chosen by the Claimants.

(i) knowledge

653. Mr Brothers developed oesophageal cancer in 1997 and it was diagnosed on 11 November 1997. In 1999 he developed cerebral metastatic oesophageal carcinoma (in other words, secondary to his oesophageal cancer) and, as I have said, died on 13 June 2000.

654. He died less than 3 years after the onset and diagnosis of his cancer and the Defendant accepts that his cause of action was extant at his death. The Defendant contends that Mrs Brothers had statutory knowledge by the date of her husband’s death and hence had to begin proceedings by 13 June 2003 to be in time. In fact proceedings were commenced in this case on 23 December 2004 with the result that it must be established that she had statutory knowledge after 23 December 2001 for the claim not to be statute-barred. If she cannot do so she must rely on section 33. It is contended on her behalf that she did not acquire the relevant knowledge until 2002. If that is so she has an absolute right to proceed subject to the strike out argument.

655. Mrs Brothers first met her future husband at a friend’s wedding on 22 May 1965 and they were married on 1 January 1966. Apart from what he told her some years after the events, she had no contemporaneous accounts from him of what occurred when he played a part in the nuclear tests. She could, of course, speak directly about his developing health difficulties in later years. She also gave this description of her late husband:

“As a loyal serviceman John would not ever want to hear anything said against the Royal Air Force and he also had the view that he could not say very much anyway about his service as a result of being bound by the Official Secrets Act. John was a very loyal man and very quiet and considerate.”

656. That evidence was unchallenged and I accept that description unreservedly. I have no doubt that the first sentence reflects a theme that applies to many whose claims might now be advanced if permitted to do so.

657. Piecing the evidence together, the position appears to be that Mr Brothers left school at 18 and went straight into the Royal Air Force to do his National Service. The records show that he enlisted on 2 October 1951, almost exactly a year before Operation HURRICANE. He was not involved in that operation, but he was involved in Operation MOSAIC starting on 16 May 1956, Operation BUFFALO, Operation GRAPPLE and then Operation ANTLER in September and October 1957. He also took part in what are known as the Tims trials (which I understand to have been minor trials) on four occasions, the last of which ended on 1 October 1957. It is not, as I understand it, being said that his participation in those trials necessarily extends the scope or ambit of the claim made on his behalf, but there is a suggestion that figures given by the Ministry of Defence for his exposure to radiation may not have taken his presence at those tests into account. That having been said, the Defendant admits that he was exposed to ionising radiation in a total amount of 108.8 mSv. His “Blue book” entry shows a total dose of 106.7 mSv, but AWE have assessed the dose at a slightly higher level of 108.8 mSv because of his attendance at the Tims trials.
658. Although it was his ambition to become a pilot, he failed the aptitude test and in due course on 27 February 1952 was commissioned as a navigator. His wife also told me (which I accept) that his attitude was he was one of the luckiest men alive because the RAF paid him to do a job that he absolutely loved, namely, flying.
659. As a navigator his task was to navigate a “sniffer” plane through the clouds generated by the explosions in order to collect radioactive samples. It appears that he did wear a dosimeter when he was flying through these clouds. Mr John Spatcher, a colleague and pilot at the time of the tests, made a statement for Mrs Brothers which, he said, reflected the shared experience that he had with her husband. It spoke of the mission upon which they embarked and an indication of occasions when it was thought that they had been exposed to quite significant ionising radiation.
660. Mrs Brothers said that her husband did enjoy swimming and that he told her that he used to swim in the water surrounding the islands where the island tests took place. He enjoyed the water to cool off. He would have showered in locally generated water. She thinks that he would have eaten fish. This is, of course, consistent with evidence given by others of the way life was conducted during tests on the islands and it would, it may be thought, be surprising if Mr Brothers did not act as everyone else did. The Defendant asserts that he was “not exposed internally”, but if this evidence is accepted at trial it would raise the possibility that this occurred and may call into question the assessment of exposure referred to in paragraph 657 above leaving aside any other reservations there may be about the accuracy of the measurements.
661. Mr Brothers had a number of medical complaints over the years including eczema in the 1950s and 1960s, possible sterility in 1971/1972, glycosuria in 1976, cataracts in the mid-1990s, oesophageal cancer in 1997 and a brain tumour in 1999. The sensible focus in the proceedings was upon the oesophageal cancer.
662. Mr and Mrs Brothers emigrated to Australia in 1977 and indeed were resident there when Mr Brothers died. Mrs Brothers returned to the UK in April 2007.
663. Mrs Brothers said that after her husband’s diagnosis with cancer in 1997 she asked him whether he could have been affected by his service in the aircraft at the time of the tests. He was adamant that it would not have been so because he was in a sealed

aircraft with a sealed air supply. He trusted the RAF to ensure that he was safe. It would certainly appear from the dosage evidence that emerged after his death (see paragraph 657) that such protection as there was did not afford him the complete protection that he probably thought he was getting at the time. The evidence of his exposure came from the badges he wore. Those badges would not have recorded any exposure from the longer-term consequences of fall-out (and there is no reason to think that he would have ever been aware of this).

664. It appears that Mr Brothers did keep a scrapbook of his time at the tests and Mrs Brothers found an article from *The Australian* dated 31 December 1984 when she looked through his papers after his death. The article related to the Australian Royal Commission (see paragraphs 392-400) and was nothing to do with the health issues of those who took part in the tests.

665. As I have indicated, Mrs Brothers was devastated by her husband's untimely death and was too upset to think about what had led to it until she started thinking about it some 9-12 months later. First of all she contacted Mrs Spatcher who then suggested that she contacted a Mrs Shirley Denson, who was personally active within the BNTVA and whose late husband had also flown through nuclear clouds following detonations. Mrs Denson recommended that she wrote to the NRPB to obtain her late husband's dosage chart which indeed she did do. When the results were received (see paragraph 657 above) she wrote to Dr Ransom who had been responsible for her late husband before he died. Indeed she wrote on the same day to a Dr Harper of the Radiation Oncology Department who, along with Dr Ransom, was based at the Royal Perth Hospital. Her letters contain the following paragraph:

“I have always believed that John's cancers were caused by his RAF Service in 1956/57, when he was flying through atomic clouds, collecting radiation samples, at the Monte Bello Islands, Maralinga and Christmas Island. I have recently obtained a copy of his Radiation Dosage Chart. I have asked for clarification of the dates shown, as they do not co-relate with the dates of the atomic flights shown in John's Flying Log Book. He flew six more missions after the last date recorded....”

666. Dr Ransom replied to her on 4 April 2002 saying that “it is possible that his radiation dose at least in part contributed to the development of his malignancy.” Dr Ransom noted that Mr Brothers “was a smoker and this is a known risk factor for carcinoma of the oesophagus.”

667. She received a lengthy letter from Dr Harper in June 2002 which contained the following paragraph:

“Whether his exposure to radiation in the late 1950s contributed to his malignancy developing in 1990s is highly problematic. We know that exposure to ionising radiation does increase one's risk to the development of malignancy, at least on population studies and there is usually a latent period of a decade or more. We also know that smoking is strongly associated with the development of malignancy in the lung and

upper aerodigestive tract such as the oesophagus. It might be presumed that his exposure could have increased his risk and it is possible that risk was magnified by his smoking. However we know that the development of malignancy is a very complicated process and in particular oesophageal malignancy is also associated with diet in some cultures.”

668. Dr Harper, having said that, said that he did not really feel qualified to assist which is presumably why he headed his letter “Private Confidential and without prejudice”.
669. At all events, Mrs Brothers had plainly started on a process of inquiry and by the time she read Dr Ransom’s reply she had received some partial encouragement that she was “on the right track”. She consulted Messrs Russell Jones and Walker, who had been instructed by Mrs Denson to investigate a claim in respect of her late husband’s death. In essence the advice Mrs Brothers received from them and from Mr Fudge of Clarke Willmott the following year was that she would have to wait for supportive scientific evidence.
670. As will be apparent from what I have said previously (paragraphs 514-521), my preferred view is that no “knowledge” could have been acquired by any veteran or descendant of a veteran until the results of the Rowland study became known. However, I am unable, on the authorities as I perceive them to be, so to hold. On whatever view of the authorities that might otherwise apply (see paragraph 521), I have no doubt that by sometime after April 2002 (but, subject to the next paragraph, not before) Mrs Brothers had crossed the threshold into the arena of “knowledge” within the Limitation Act. Pursuing the medical avenue and then seeking legal advice seems to me, on the authorities, to be sufficient to have crossed that threshold. Provided she had not crossed that threshold before 23 December 2001 (some 18 months after her husband’s death), the claim is not statute-barred.
671. The Defendant’s argument is that she had raised in her own mind (and indeed directly with her husband) the question of whether the tests could have had anything to do with the cancer that he developed. However, as it seems to me, her husband’s adamant view that it was nothing to do with that would have to be conclusive on the issue unless there was clear evidence that she did not accept it and had been looking into the matter with vigour prior to his death. As in Mr Ayres’ case, I have absolutely no doubt that, entirely reasonably, the whole focus of her life and that of her husband after the diagnosis in 1997 was to address the treatment he needed rather than to spend time questioning how it all came about. She said in her witness statement that the hospital was 250 miles away and this added to the difficulties of coping with everything else that had to be dealt with. There is nothing in the contemporaneous medical records to suggest that either she or Mr Brothers raised the question of the tests with any of the doctors. The only basis upon which it could be suggested that Mrs Brothers was herself convinced of a connection between his presence at the tests and the cancer was the sentence in her letter (see paragraph 665) commencing with the words “I have always believed”. Those words were, of course, used nearly two years after her husband had died and at a time when she had taken some preliminary steps to start investigating. She says that she was over-emphasising the strength of her feeling to ensure that the recipients of the letters took notice. I am inclined to accept that. There is really no material prior to that letter that suggests that she had formed any such clear and unambiguous belief before his death. It may be that the

true reading of that letter is that by the time she wrote it she had come to believe in the connection between his presence at the tests and his death, but anything prior to that was, in my judgment, nothing more than a generalised suspicion.

672. If that is correct, ought further information to be imputed to her under section 14(3)? She accepted that she had an awareness of issues being raised in Australia by Australian veterans with the Australian Government and of articles dealing with the clean-up operation at Maralinga. But ought she reasonably to have pursued such avenues as may have existed to seek further information about the possible link between her husband's illness and the tests before his death? I do not think so.
673. For those reasons I am not satisfied that she possessed relevant knowledge before her husband's death, nor indeed before 23 December 2001. She had acquired it by sometime after April 2002.
674. If I am wrong about that and she had, directly or by the addition of information she ought reasonably to have acquired, acquired relevant knowledge by the date of her husband's death, I will address how I would have exercised the section 33 discretion.

(ii) section 33

675. If I am wrong in the conclusion to which I have come in relation to the issue of knowledge, the period of delay in instituting proceedings is from 13 June 2003 to 23 December 2004, a period of 17-18 months.
676. The Defendant asserts that that delay would be excusable if Mrs Brothers could point to some change which meant that whilst she could not sue in 2002 she could so in 2004. Whether the point has merit as an argument is doubtful, but the short answer to it is that that period will make no difference at all to the Defendant's ability to respond to the case presented on the late Mr Brothers' behalf.
677. A point made on behalf of the Defendant is that it is questionable whether she can adduce any reliable evidence about how her late husband was exposed to ionising radiation above the admitted dose. Leaving aside the question of what impact the "admitted dose" might have had, I would merely observe that this is precisely the point I have made elsewhere: the burden of proof may be too much to overcome in certain cases. But it does not mean that there is no reasonable prospect of the Defendant having a fair trial on the issue – indeed quite the converse. (I should emphasise that I am not necessarily suggesting that the Defendant's argument in this particular case is correct: I am merely drawing attention to the way in which, in assessing whether a fair trial is possible, the burden of proof may be of more importance in a case such as this than it might in others.)
678. The Defendant says that it is unable to call the witnesses who devised the sampling operations in which Mr Brothers was involved including Commodore Sir Hugh Martell (would have been able to give evidence about the cloud sampling operation) and Air Commodore Denis Wilson. I have dealt with this issue in paragraph 596.
679. The Defendant makes similar points about causation to points made in other cases. Professor Parker says that UNSCEAR 2006 implies that ionising radiation can cause oesophageal cancer at any dose and the risk of developing the cancer increases with

an increasing dose. Professor Kaldor agrees that exposure to ionising radiation has been shown to be a cause of oesophageal cancer, but the exposure level required to double the risk is “well over 1000 mSv”. Professor Parker responds by saying that Professor Kaldor’s view “does not preclude a lesser radiation dose materially increasing the risk of disease”. Professor Mothersill says that radiation “is known to materially increase the risk of all cancers including squamous carcinoma of the oesophagus” and she has expressed the view that “exposure to ionising radiation, when combined with the history of tobacco smoking, multiplied the risk that [Mr Brothers] would develop these cancers.”

680. I would have said, against that background, that the causation case is clearly arguable.
681. For my part, had it been necessary to consider section 33, I would have taken the factors I have mentioned along with the more generic factors referred to in paragraphs 572-625 above and said that the discretion should be exercised in Mrs Brothers’ favour.

(c) KENNETH MCGINLEY

682. Mr McGinley was born in Scotland on 18 September 1938 and is now 70 years of age. He gave oral evidence before me and was cross-examined at length. I will say more of my assessment of his evidence in due course.
683. He became a founder member of the British Nuclear Test Veterans’ Association (BNTVA) and was Chairman of the Association from its inception in 1983 until 2000. There is no doubt that for quite a number of years he had been one of the major forces in bringing the concerns of the veterans into the public eye and there will be many veterans, I apprehend, who will have cause to thank him for doing so. With the assistance of Eamonn O’Neill, a journalist, he produced a book entitled ‘No Risk Involved’, published in 1991, setting out what were said to have been his experiences of his time on Christmas Island and his subsequent health issues.
684. His case was chosen by the Defendants as one for consideration in this case. He said that initially he “didn’t want to know” about this litigation because he had spent 19 years at the forefront of the campaign and was pleased to have had a “reasonable rest” from it, but he was eventually persuaded to take part on the basis that having “started it [he] should finish it.”
685. I suspect that he has been seen as a thorn in the side by the Ministry of Defence over the years and, whilst Mr Gibson was quite restrained in his oral submissions, the written Closing Submissions attacked Mr McGinley’s credibility in a number of respects. I should make it quite plain that any assessment I might make of him as a witness relates to the very narrow issue before me and not to any wider issues.
686. The proceedings in his case were issued on 23 December 2004 with the result that the relevant date for his “date of knowledge” is 23 December 2001. The Defendant’s case is that he had “actual knowledge” from 1982 at the latest. The written Closing Submissions of the Defendant in relation to his case suggest that he had constructive knowledge from 1958 of the attributability of vomiting, diarrhoea and skin blistering caused by his time on Christmas Island or from 1976 when he was diagnosed with infertility. However, Mr Gibson told me in his oral submissions that “we are seeking

to fix Mr McGinley with actual knowledge from 1982” and I am proposing to focus on that and the position thereafter. The case advanced on his behalf is that, notwithstanding things he had said and done in the past, he was in no better position than anyone else to become possessed, either actually or constructively, of the relevant knowledge for the purposes of the Limitation Act. It is contended that he did not acquire the relevant knowledge before 23 December 2001.

(i) knowledge

687. He was an engagingly frank and open witness who had lost none of the combative instincts that had obviously led to him becoming the champion of those he felt had been short-changed by various Governments over the years. He was an older, wiser and more restrained man than the man seen on some of the video clips I saw and as quoted in some of the newspaper cuttings that were put to him relating to things said some 20 years or more ago. There will be many who, over the years, have achieved some of the highest offices in countries throughout the world about whom the same story could be told.
688. He sought to distance himself from some of the things he was quoted as saying, not merely in the interviews and press cuttings, but also in the book that, with assistance, he wrote. His efforts to do so were not always convincing. However, he explained it as being his version of what, he said, would now be called “spin”. It provoked laughter when he said it. It may itself have been “spin”. It may have been true. Does it matter for present purposes? I will return to this in the context of what I can and cannot accept about the issue of knowledge in his case.
689. Mr Gibson argues that much of what Mr McGinley said in those earlier days demonstrates that he had crossed the threshold from ignorance or mere suspicion to “knowledge” for the purposes of the Limitation Act. I will deal with that issue shortly, but there is, to my mind, little doubt that he became convinced that the physical problems he faced from time to time were attributable to his time on Christmas Island. As a result of that and his letter to *The Daily Record* he became something of a figurehead for those of a like mind. Mr Gibson paid him the compliment of being the “admirable [and] tireless driving force” for the campaign over many years. Whether Mr McGinley sought that position or whether events conspired to thrust it upon him probably matters little. If his legacy is that he helped highlight a genuine concern for a large number of people he will, I believe, have felt that his efforts will not have been in vain whether or not those concerns prove ultimately to have been well-founded.
690. Much of what Mr McGinley knew (or, arguably, ought to have known) at any stage after 1982 is bound up with his activities with the BNTVA. I do not propose to extend this part of the judgment by repeating events that are recorded in the section of the judgment that deals with the BNTVA (see paragraphs 255-325 above). I am sure Mr McGinley would not contest the proposition that he was probably better placed than anyone in the UK between 1982 and 2000 (when he ceased to play an active role within the BNTVA) to have an appreciation of the current state of the learning available in relation to the issues that the veterans were raising. However, he would, I am sure, also be the first to accept that he started life as a Sapper with the Royal Engineers and that his appreciation of the nuances of scientific thought and legal reasoning were no greater than anyone else from such a background. He was

obviously good at articulating things in a speech and in an interview and had a presence that commanded people's attention. But in terms of his own true understanding of the issues he was heavily reliant on the advice and guidance of others.

691. Since the Defendant has chosen his case as one of the Lead Cases and Mr McGinley was cross-examined at greater length than any other witness, it is important, in fairness to him, not to place him on some kind of pedestal as the fount of all knowledge in relation to the issues that have been raised. I say this because the Defendant's case, as presented in written form, is that the "evidence that the Claimant had actual knowledge of attributability from 1982 at the latest is overwhelming", the attributability presumably relating to all illnesses and conditions of which he had by then complained and of which he had entertained the suspicion that they might have been caused by his time on Christmas Island. This is the earliest of all the "pragmatic" dates chosen by Mr Gibson in relation to the Lead Cases.
692. Mr Gibson and his team draw attention to particular things said by Mr McGinley, to some of which I will refer shortly, and submits that if they do not constitute knowledge for the purposes of the Limitation Act "then the Claimants have succeeded in driving a coach and horses through the simple approach that is advocated", presumably the simple approach of section 14. Having regard to my analysis of section 14 (see section 16 of this judgment) I am not so sure the approach is so obviously simple, but nonetheless I accept that Mr McGinley's case needs to be considered with care.
693. The first matter relied upon is what is said to be Mr McGinley's "confirmation in proceedings before the European Commission of Human Rights that he "became aware of the alleged connection between [his] illnesses and [his] exposure to the nuclear detonations as early as 1982". That quotation is taken from the decision as to admissibility of the Commission in November 1995 dealing with the claims lodged by him and Mr Egan (see paragraph 292). The decision also records the following:
- "Following a series of articles in the press in 1982 about the potential effects of the Christmas Island explosions on those exposed to them, the applicant came to attribute his history of illness to his service on the island and sought an increase in his pension to reflect this."
694. The application to the Commission had been put forward on his behalf by Mr Ian Anderson, a lawyer practising in the USA who had contacts in Scotland. Mr Anderson's letter in support dated 4 November 1993 said that Mr McGinley "was not aware prior to November 1982 that his various medical problems might be related to, or associated with his exposure to radiation from the detonation of five nuclear bombs at Christmas Island ...". (My emphasis).
695. If one stopped at that point, and took Mr Anderson's letter as reflecting Mr McGinley's position in November 1982, it would simply be what one would expect of anyone at that stage, namely, the makings of suspicion that there was a connection between certain health issues and presence at the tests, but no more. However, the application that had been made on 20 April 1993 was supported by a statement signed by Mr McGinley in which the following paragraphs appeared:

"In 1982 applicant's attention was drawn for the first time, by means of a magazine article, to the realization that his prolonged and continuing debilitating illnesses and infertility were caused by his deliberate and unprotected exposure by The United Kingdom in 1958 to the five nuclear air detonations in close proximity to Christmas Island.

...

By 1982 more information regarding the serious health problems of ex-servicemen, who like applicant had been exposed to ionising radiation on Christmas Island in 1958 began to circulate in newspapers, magazines and the public media."

696. These paragraphs had been preceded by the following assertion:

"During April 1958 to September 1958 applicant and hundreds of young men of similar age whose military units had also been assigned to Christmas Island, were deliberately exposed to ionising radiation for the purposes of the atomic and nuclear research program which was being carried out by The United Kingdom at that time to study inter alia the effects of ionising radiation on unprotected military equipment, stores and servicemen."

697. The Commission recorded the following:

"The applicants [referring to Mr McGinley and Mr Egan] maintained that the purpose of the line-up procedure ... had been deliberately to expose the servicemen stationed on and in the vicinity of Christmas Island to radiation for experimental purposes."

698. During his evidence Mr McGinley expressed concerns that Mr Anderson had taken certain things on his behalf too far. However, it does have to be said, in relation to that last paragraph, that Mr McGinley had made the "guinea pig" allegation on a number of occasions. For example, in the Nationwide programme in December 1982 (see paragraph 260) he said this:

"... but we have got documentation now to prove that both the British government and the American government did deliberately use us as their guinea pigs."

699. That matter goes to the motives behind the tests and Mr McGinley accepted that he was exaggerating at that stage. He put it this way during his cross-examination by Mr Gibson:

"I was campaigning for British servicemen. ... I was putting my head on the block on many occasions, making statements which were, I would say, a bit over-exaggerated. I have got to

admit that. Because at the end of the day, I was trying to get more servicemen to come forward to join this association, to determine if servicemen may have been affected. That was my job, to stand up for these servicemen. Someone had to have a strong voice and I believed that was exactly what I was doing.”

700. I think it is probably right that there was an element of spin, as he described it, about this. However, what I have to determine for the purposes of the present issue is whether all this material shows that Mr McGinley had already by November or December 1982 crossed the threshold into the arena of knowledge.
701. Obviously, it is necessary to consider what he said in 1993 (when he put in the application to the European Commission on Human Rights) about what he thought in 1982 and, of course, to look in 1982 at what he said about what he thought at that time. The truth, it seems to me, is that, as with others, at that time and for a while thereafter he did think that there may have been a connection between his problems and the tests, but at that stage it could be no more than an unsupported suspicion. Mr McGinley would have been aware of what experts who were supportive of the Government’s position were saying. Dr Hugh Evans, a radiation protection officer from Imperial College, London (not Professor H John Evans), who was also interviewed in the Nationwide programme, said the radiation levels at the tests “were extremely low” and “[so] much less than they receive in everyday life from actual sources that I don’t think you could consider it.” He went on to say even if he was “working very hard for [the veterans he] would find it very difficult to justify radiation as any cause for their illnesses.”
702. What is significant is that there is no reference in his medical records to any question he raised about whether the one condition that he now says he relies upon (namely, infertility) was connected with exposure to radiation. He made no reference to that in the statement made in December 1994 in support of the Commission application, although there is oblique reference to it in a statement dated September 1997 also in connection with the Commission proceedings. He had relied upon “reduced fertility” in a War Pension application he made on 30 November 1984.
703. The essential thrust of the evidence he gave to me was that he was seeking answers to questions raised about the scientific support for a connection between his own conditions (and indeed those of others) and participation in the tests. What he said about infertility was this:
- “I believe you have got the scientific proof now, and my justifiable claim is that I suffer from infertility as a result of my participation into the tests.”
704. I presume he had in mind, when saying this, the view of Professor Mothersill who has said that “Low fertility is linked with radiation exposure” and that this can be long-term and those of Professor Parker who agrees that infertility “can be caused by exposure to ionising radiation”. The difficulty with suggesting that this is new scientific evidence, as I see it, is that if this was regarded as “significant” by Mr McGinley (which, it is plain, he did as would any reasonable man) the attribution to the tests was plainly made earlier and indeed it has long been established that exposure to radiation can cause sterility or infertility: see, eg, Mr Edson’s paper

referred to in paragraphs 163-164 above. In the Nationwide programme in which Mr McGinley himself participated in December 1982 the following was said by Richard Kershaw: “If radioactive fall-out is suffered in very strong doses it can cause death; exposure to small amounts can still cause dreadful effects, sterility, leukaemia, lymphatic cancers, and certain genetic disorders.” (My emphasis).

705. From a personal and subjective point of view, it is easy to understand why Mr McGinley, as the high profile spokesman for the BNTVA, might not have wanted to raise the profile of his infertility in the campaign and preferred to focus on other matters. He was not asked about this, but it seems a reasonable inference to draw. But if I have to ask myself whether at some stage prior to December 2001 he either had actual knowledge or, on the basis of advice he might reasonably have obtained, constructive knowledge that his infertility could be attributed to exposure to radiation exposure as a result of being at the tests, the answer has to be ‘yes’.
706. It does not seem to me to matter greatly when that was, but it is difficult to see why the attribution should not have been made by, say, the mid 1980s. By then a “head of steam” had been created in relation to the general attributability of health problems for veterans to their presence at the tests. (I should say that I do not attach any significance to the War Pension application he made on 30 November 1984 for this purpose for reasons given elsewhere: see paragraph 525) Because of the lack of evidence of exposure during the tests to ionising radiation above background levels, it would never have been possible to prove the case, but that is not the conventional test for knowledge within the Limitation Act (see section 16 of this judgment).
707. I should say, should it ever be relevant, that my “preferred view” as to knowledge in this case ought, if it was permitted, to apply in Mr McGinley’s case too. I say this because, although the mechanism by which infertility is caused by ionising radiation has not been articulated clearly in the evidence before me, Professor Parker appears to support the link on the basis of it being one of a number of “bystander effects” of low level ionising radiation. Credible evidence that those present at Christmas Island may have been so exposed did not become available until the Rowland Report.
708. However, it does follow from the conclusion at which I have arrived that the only claim that Mr McGinley wishes to make in this litigation is statute-barred. He will need a favourable exercise of the discretion under section 33 in order to proceed.

(ii) section 33

709. In Mr McGinley’s case there is, of course, a long delay between the acquisition of the relevant knowledge and the commencement of proceedings. But the Defendant will be in no worse a situation in responding to his case in relation to breach of duty than in any of the other cases. For reasons given elsewhere (see paragraphs 572-611) I consider that the Defendant will be able to respond by virtue of the substantial contemporaneous documentation that exists in relation to the tests at which he was present.
710. There is a small example within the case Mr McGinley would wish to advance that illustrates the point I have just made. His recollection is that it rained immediately after the GRAPPLE Y detonation, but the Defendant’s meteorological records indicate that no rain fell at the meteorological observation point on Christmas Island

in the 12 hours after the GRAPPLE Y detonation. Although that material is currently in a document that remains classified, I cannot believe that arrangements cannot be made for that part of the documentation to be deployed at any trial on liability. The material will be there for the trial judge to evaluate.

711. Given that the focus of his personal claim is now his infertility and nothing more, I have been concerned about whether the Defendant would be prejudiced in investigating that given that it was 1976 when it was diagnosed. However, when he made his War Pension application, Mr McGinley was examined by a Consultant Urologist in July 1987 and that report is still available. Furthermore, at the time of his Commission application a report was obtained from Drs Sharp and Muirhead of the NRPB commenting on the various conditions alleged, one of which was the infertility.
712. One difficulty he may face is that there is, as I understand it, no evidence of him having had a normal seminal analysis prior to his time at Christmas Island. He was, of course, in his early 20s when he was there. His seminal analysis was performed in 1976 when he was 38 and it may be difficult for him to prove that what was demonstrated was anything more than a consequence of being older. Whether that was a reason for him not being picked as a test case for the BNTVA I do not know, but it is an issue he may have to face.
713. For my part, I would not see that as something that should outweigh the factors mentioned in paragraphs 572-675 in the balancing of the considerations under section 33.
714. In his case, in particular, I would add the point that, having been at the helm of the BNTVA for years, he was clearly of the view that the limitation point would never be taken against the veterans (see paragraph 335). He had always been led to believe that, if new evidence became available, the Defendant would consider claims for compensation. His argument would be that the Rowland Report has emerged, but now the limitation point is being taken. Given that it was not taken in *Pearce* I think there is some force in that point. I reflected on it more generally in paragraph 599.
715. I would permit the claim to proceed, though having to express some reservations about the strength of the causation case for the reasons I have summarised.

(d) MICHAEL RICHARD CLARK, deceased

716. The late Mr Clark was born on 4 April 1938 and died on 28 September 1992 the age of 54. His case was chosen by the Defendants as one for consideration in this case.
717. Evidence was given in the case brought on behalf of his estate and as his dependant by his widow, Mrs Alice Clark. She was a measured and careful witness whose evidence I accept without hesitation.
718. In February 1991 he was diagnosed with carcinoma of the lung with metastatic lymph node and bone cancer and, as indicated, died about 18 months later.
719. The relevant date for limitation purposes in this claim by reference to the date of issue of the proceedings is 31 March 2005. The Defendant's case is that the claim was statute-barred 3 years after Mr Clark's death, namely, on 28 September 1995. The

position taken on behalf of Mrs Clark is that (a) her late husband did not have relevant actual or constructive knowledge by the date of his death but (b) that I am “driven to the conclusion” she had acquired relevant knowledge “in about 2002” because, as Mr Browne put it, she “took herself off to consult solicitors in 2002” the effect of that being that she should have issued proceedings by 2005. It is, therefore, accepted on her behalf that the section 33 discretion would have to be exercised in her favour for her claim to proceed.

(i) knowledge

720. As will be apparent, my preferred time of the emergence of the findings of the Rowland study is not one I have felt able to adopt for the purposes of acquiring relevant knowledge. In this case (as in Mrs Brother’s case) the Claimants’ legal team have adopted a realistic or pragmatic view of the authorities to the effect that going to a solicitor is sufficient evidence of “knowledge”. It does, however, have to be observed that Judge LJ in *Sniezek* (see paragraphs 505-508) noted that “significantly” Lord Donaldson of Lynton MR had not said in *Halford v Brookes* [1991] 1 WLR 428 that “seeking advice from a solicitor was conclusive, nor that, on its own, it should be treated as representing a sufficient preliminary to the issue of a writ so as to lead to the inescapable inference of the requisite degree of knowledge.” That view does have to be contrasted with the view of Simon Brown LJ in *Sniezek* when he said that he found it “difficult indeed to imagine a case where, having consulted a solicitor with a view to making a claim for compensation, a claimant could still then be held lacking in the requisite knowledge.”
721. I must examine the different positions taken by the parties to the date when Mrs Clark did acquire relevant knowledge. If the Claimants’ legal team is right, she acquired it in 2002 at about the same time as I have concluded that Mrs Brothers acquired the relevant degree of knowledge in her late husband’s case. If I should accept that then, whilst of course I would need to look at Mrs Clark’s case independently of the others, for obvious reasons I would find it unpalatable to say that Mrs Brothers should be able to proceed but that Mrs Clark should not.
722. Mr Clark went to Christmas Island as a Sapper in the Royal Engineers in November 1957 until November 1958 and was involved in the GRAPPLE Y and Z tests.
723. After he ceased his military service he became a taxi driver and that remained his occupation.
724. The presentation of possible injuries or illnesses in his case has been similar to that of others. The history had included various skin complaints and a condition relating to his nails. Sensibly, the focus for “significant injury” purposes has been upon the cancer diagnosed in February 1991. The other matters have been effectively jettisoned as trivial even though their existence as potentially caused by ionising radiation is supported by Professor Mothershill. It does have to be observed that Mr Clark did not speak of these matters as being trivial in the statement to which I will refer below, but this is a case in which, had it been necessary to do so, I would have said that he was not precluded on relying upon the cancer for the purposes of “knowledge” rather than the skin complaints (see paragraphs 488-497).

725. There is little doubt that upon the diagnosis of lung cancer Mr Clark gave some thought to the possible impact of his presence at Christmas Island upon the development of that cancer. There is a short note in the medical records on the day of the diagnosis indicating that he told the doctors that he had been on Christmas Island in 1957/58 and was “unprotected” during the testing. A few weeks later, on 7 March 1991, he dictated his recollections to his daughter which she typed up and he then signed. Making the statement coincided with Mr Clark becoming interested (for the first time) in the activities of the BNTVA and in what that Association had been doing and in the information it could give. Mr McGinley (whose book “No Risk Involved” had been published only a matter of a month or so before this) had written a letter to him dated 6 March 1991. It is not clear whether it was Mr McGinley’s letter that prompted the making of the statement, but it matters little. The purpose of making a statement, Mrs Clark told me, was so that everything could be put down “for future reference, in case it was needed for a case like this.”
726. I need not set out the statement in full. It contained the familiar account of how those present were told to line up on the beach with their backs to where the detonation would take place, cover their eyes and then turn and watch the mushroom cloud after the detonation. Mr Clark said he felt an intense heat after the flash, the flash resulting in him seeing the bones in his hands. He said that whilst he was told by an officer that the detonations would be “at least 15 miles away”, it was “more like 1½ miles away.” (Whilst, as I have said repeatedly, it is not for me to arrive at any conclusion on the factual issues that would fall to be considered at a full trial, in fairness to the Defendant I think I should say clearly that, as I understand it, there is no serious suggestion made on behalf of the Claimants that any ground-based veterans were that close to any of the points of detonation: see paragraphs 129-130.)
727. There are two paragraphs in the statement that I will record in full:
- “One vivid recollection after one detonation was a fierce thunderstorm which was followed by torrential rain and it lasted for six weeks. It rained so heavily that we were floating our cigarettes around to each other inside our tents.
- ...
- Since returning from Christmas Island I have suffered from constant tiredness, my finger nails are swollen and almost balloon shaped, my toe nails have virtually rotted away, I have suffered from skin cancer on my legs and other various types of skin disorders including dermatitis. I have now been diagnosed as having terminal cancer, ie of the lungs, lymph gland, and a rare form of bone cancer and have been given six months to live.”
728. Mrs Clark herself recalls her husband speaking about the significant rainstorm.
729. An examination of that statement shows that there is no doubt that Mr Clark believed that it was witnessing the tests that caused his problems (cf. paragraph 725). He said nothing about (and would have had no reason to know about) the exposure to which he may have been subjected subsequently by reason of ingesting or inhaling material

affected by fall-out. Mrs Clark said that he had been concerned about “debris from the bombs”, which is understandable and obviously different from the more insidious and hidden consequential effects of fall-out on a longer term basis.

730. At all events, that is what Mr Clark recorded at that time. Mrs Clark told me, and I accept it without hesitation, that he was “very, very down” and “very seriously ill” at this time. He was also, she said, anxious to put things down “forcefully”. I infer from this that he was convinced that he had been let down badly.
731. It appears that one of the doctors responsible for him at the time at Oldchurch Hospital in Romford was a Dr P. L. C. Xavier who had expressed an interest in the possible link between Mr Clark’s cancer and his exposure to radiation at Christmas Island. (Dr Xavier too, one supposes, would have been thinking of prompt radiation exposure at that time.) Mr Clark wrote to Mr McGinley about this in a letter of 5 April 1991.
732. As will be clear from what I have said on more than one occasion, if unconstrained by authority, I would have concluded that Mr Clark had not, by the date of his death, acquired the necessary knowledge for the purposes of the Limitation Act because the Rowland study had not reported (let alone, of course, such a study involving the M-FISH technique at that time having been envisaged as a possibility). However, it seems to me that Mr Clark had reached a state of mind fairly soon after the diagnosis of his cancer that the cancer was “capable of being attributed to” ionising radiation to which he was exposed at Christmas Island. He would have been “barking up the wrong tree” if he believed that this was attributable to prompt radiation, but I am not persuaded that I am able to adopt an approach that discriminates between the two sources of ionising radiation for the purposes of the “knowledge” issue (see paragraph 521). Accordingly, whilst Mr Clark (perfectly understandably, given the serious terminal illness from which he was suffering) did nothing to advance any claim for compensation prior to his death, if he had done so he would have been affected by a limitation period having commenced from about April 1991. The limitation period had not expired by the date of his death, but the conclusion I have been forced to come to is that he did possess relevant knowledge by about the date I have indicated. His state of mind was, perhaps, not quite as strongly positive as that of Mr Sniezek in his claim (see paragraph 506), but sufficiently close for it not to make any difference to the conclusion to which I must come.
733. Does that mean that Mrs Clark was, as it were, “infected” by that knowledge? The answer is “possibly, but not necessarily so”. It is her state of mind that now becomes relevant. She was doubtless very preoccupied with her husband’s illness and, whilst aware of his contacts with the BNTVA, was almost certainly less concerned about that than about him. She does remember being told by the BNTVA representative who came to see them that the BNTVA did not think that there was enough evidence to take proceedings for compensation at the time. They were encouraged, consistent with the BNTVA policy at the time, to apply for a pension. I think that her state of mind at the time, bearing in mind the circumstances in which she found herself having to think of these matters, was one of uncertainty, whatever strength of conviction her husband may have had about the matter. Her uncertainty would have been confirmed by the response from the AWE to her husband’s application for a pension. It is worth recording what appeared in a statement prepared in respect of that the pension

application by Mr William Saxby OBE, BSc, CPhys, FRSP, FInstP (as Captain Saxby had by then become known: see paragraph 587). The substantive part was as follows:

“1. From soundly-founded information currently available and reviewed, the following well-substantiated facts are provided as answers to the DSS questions:

(a) Ex-Spr Clark is said by the DSS to have been posted to Christmas Island for the period from 25 November 1957 until returning to the UK on 30 October 1958. If this is correct, he was therefore present at Operations GRAPPLE Y and GRAPPLE Z conducted by the UK Ministry of Supply at Christmas Island in the periods April and August – September 1958.

(b) At the moments of detonation on 28 April, 22 August, 2, 11 and 23 September 1958 Ex-Spr Clark would have been upwind or cross-wind, and at [a] distance of [at least] 35 kilometres from the points of the five detonations for Operations GRAPPLE Y and GRAPPLE Z.

The DSS state that Ex-Spr Clark was attached to 51 Port Squadron, but we have no information on Ex-Spr Clark’s duties.

(c) Ex-Spr Clark was not exposed to any levels sensibly different from ZERO in the areas in which he carried out his duties, either from initial ionising radiations or from radiations arising from early-local residual radioactive material (fall-out).

(d) There would have been no requirement, nor need, for a Serviceman with the duties carried out by Ex-Spr Clark to have been issued with a personal film-badge dosimeter, consequently no such issue was ever made.

The assessed maximum effective dose that might credibly have been received by Ex-Spr Clark consequent upon his participation in Operations GRAPPLE Y and GRAPPLE Z was not distinguishable from ZERO.

Radiological Safety Regulations Christmas Island were issued for Operations GRAPPLE Y and GRAPPLE Z by the Director AWRE, on behalf of the Director General Atomic Weapons Ministry of Supply, which were implemented by the RAF Air Officer Commanding Task Force GRAPPLE and were made known to all personnel. They included instructions on potential radiological hazards, safety precautions and the issue and wearing of film badges where necessary. They were enforced in accord with normal military disciplinary procedures.

2. The recent (1988) Report by the National Radiological Protection Board, "Mortality and Cancer Incidence in UK Participants in the UK Atmospheric Nuclear Tests and Experimental Programmes" (NRPB – R214), shows that for participants, each of total mortality, total cancer mortality and incidence, solid controls, is less than the National average for a comparable set of adult males in England and Wales, and that for other cancers does not sensibly differ from that National average; there is no shortening of life expectancy. It showed that there was no correlation between radiation exposure and cancer mortality and incidence, nor indeed other causes of death.

Conclusion

Ex-Spr Clark's exposure to ionising radiations resulting from the UK atmospheric nuclear weapon test programme, Operations GRAPPLE Y and GRAPPLE Z did not sensibly exceed ZERO. That such zero levels of ionising radiations and other nuclear test effects in the Pacific area did not cause, nor contribute significantly to, the lung cancer which he now has is beyond any doubt."

734. I consider that, so far as Mrs Clark is concerned, she certainly entertained suspicions that her husband's terminal illness had arisen from his time at Christmas Island, but it had not reached the level of conviction that it had with him as at April 1991. Accordingly, one would need to look for subsequent events that translated her from that state of mind to that of someone who had crossed the threshold into the arena of "knowledge" for the purposes of the Limitation Act. Although she continued some loose contact with the BNTVA after her husband's death (and indeed, on their advice, made an unsuccessful application for a widow's pension, the application being rejected in November 1992), nothing very material occurred thereafter to change her state of mind.
735. Ought further information to be imputed to her under section 14(3)? As she said in her witness statement, and as I accept, she believed that further research and investigation "was essential" before any true connection between his cancer and the tests could be made. I have seen nothing that operated to make the connection stronger in her mind until she contacted Messrs Clarke Willmott in June 2002 and I cannot see that a "reasonable person" would have done anything more than she did in this regard. Indeed, having sought solicitors' advice, their advice was not very positive, but it has been accepted on her behalf that this constituted the moment when she acquired relevant knowledge.
736. I accept that this is the earliest moment when it could be said that she had acquired "relevant knowledge".
737. As I have already said, it has been conceded that her claim is out of time and accordingly, she has to rely upon section 33. I will deal with this shortly on the basis, first, of my conclusion that her date of knowledge was in 2002 and, second, if I am

wrong about that and it was at a time before her late husband's death, then on that basis too.

(ii) section 33

738. If I am correct that her date of knowledge was June 2002, I can see no basis for saying that the delay of a little under 3 years before the proceedings were deemed issued can have caused any significant prejudice to the Defendant's ability to respond to it over and above such prejudice as may have existed in 2005 when, on this basis, proceedings should have been issued. As I have already said, she would have acquired knowledge at about the same time as Mrs Brothers (see paragraph 673) and I would be reluctant to conclude that Mrs Brothers should be able to proceed and Mrs Clark should not unless truly forced to do so.
739. However, the issue is really subsumed in the analysis I would offer if her date of knowledge was in 1995, as the Defendant contends. Mr Clark was at GRAPPLE Y and Z. He did apply for a War Pension in 1991 and it was rejected (see paragraph 733). In other words, the opportunity was taken by someone who knew the position from the Defendant's point of view very well (Mr Saxby) and the view on the issue of exposure was articulated clearly. In one sense, all the material needed to defend Mr Clark's claim in relation to exposure exists already, has been committed to writing and can be deployed in this action. To the extent that wider issues are, or may be, relied upon at trial, the very substantial contemporaneous documentation about the tests in which Mr Clark played a part are available. For reasons I have given already, since the burden of proof would be on Mrs Clark in her late husband's case and bearing in mind the existence of that documentation, I cannot see why the Defendant is so significantly prejudiced in meeting the claim notwithstanding a delay on this basis of some 13 years.
740. As I have indicated previously (see paragraph 600), some of those who played a significant role in the organisation of the GRAPPLE tests died before the limitation period, even on the Defendant's view of it, had commenced. It follows that any prejudice (if there is prejudice) on that account arose before any "culpable" delay on Mrs Clark's part, if indeed there was culpability.
741. So far as causation is concerned, Mr Clark contracted lung cancer. Its causative link with ionising radiation is supported by Professors Parker and Mothershill. There is evidence, as I understand it, that Mr Clark had been a relatively heavy smoker for many years prior to his death. Commonsense dictates that this is an issue that will need to be addressed, but cases such as *Novartis* (see paragraphs 232-233) and *Shortell v Bical Construction* (see paragraph 741) offer some support for establishing a causative link even on the basis of the existing legal tests.
742. For those reasons and in the circumstances of the "generic" factors referred to in paragraphs 572-625 above, it would, in my view, be equitable to disapply the section 14 in this case.

(e) ANDREW DICKSON, deceased

743. The late Mr Dickson was born on 8 June 1938 and died of a heart attack on 26 May 2006 a little short of his 68th birthday.

744. Evidence was given in the case brought on behalf of his estate and as his dependant by his widow, Mrs Evelyn Dickson. Mrs Dickson was in the witness box for a very short while and her evidence was substantially unchallenged. I have absolutely no reason to doubt it and I accept it. She did not meet her husband until 1975 and so any conversations she had with him about what happened during his service were many years after the events.
745. His case was chosen by the Defendants as one for consideration in this case and, as will already have become apparent (paragraph 256), he was an early and vigorous BNTVA supporter.
746. The relevant date for limitation purposes in this claim by reference to the date of issue of the proceedings is 23 December 2001. The claim was issued during Mr Dickson's lifetime and, accordingly, it is his state of knowledge that is relevant for limitation purposes.

(i) knowledge

747. Mr Dickson enlisted with the General Services Corps in February 1954 when he was 15. When he became 18 in January 1957 he was transferred to the Royal Engineers. He served as a Lance Corporal at Christmas Island for about a year between March 1958 and March 1959 during the GRAPPLE tests. There is an issue about his precise duties, but the issue is immaterial for present purposes. He left the Army in about 1963.
748. He had made various complaints concerning his health during his lifetime (to some of which I will make reference below). The Defendant had contended that from 1958 he "had actual or constructive knowledge that the illnesses for which a claim is now brought were capable of being attributed to exposure to ionising radiation", but Mr Gibson took the pragmatic approach of contending that he "had actual or constructive knowledge of a large number of conditions ... certainly those" now being proceeded with by 1985, those being skin conditions, lethargy, loss of concentration and memory loss and stomach problems/colitis. As I understand the Defendant's argument, it is that these matters constituted matters of significance within the Limitation Act and as a result Mr Dickson had relevant knowledge of them at an early stage. I assume the Defendant's argument in respect of the ischaemic heart disease and chronic renal failure, which did not emerge until his later years, is that they should be regarded as a later injury (see paragraph 491) that could only be capable of being permitted to proceed if the section 33 discretion is operated favourably. It is contended on Mrs Dickson's behalf that he had not acquired relevant knowledge before his death in May 2006.
749. If I recited in this judgment the very substantial number of things said and done by Mr Dickson in connection with the matters the subject of these proceedings this judgment would be extended considerably. I do not say that with any suggestion of criticism. Mr Dickson plainly held a genuine belief (shared by many others) that his own health problems were caused by Christmas Island and that successive Governments had not been truthful about the level of exposure that occurred there and the effect of it upon those present. Mr Browne has conceded that from the time he became involved with the BNTVA in the early 1980s, Mr Dickson was "a tireless, obsessive campaigner for the cause from [then] until his death." He was described by the Claimants' team as

“an obsessive man on a mission and was determined not to let up in his activities until he had obtained answers to his questions.”

750. I think that that is a fair assessment. It is evidenced by the total of 19 letters he had written to various Government Ministers including various Prime Ministers, articles he wrote for various magazines, interviews he gave to various newspapers, various pension applications made and lectures given around the country. He was in fact expelled from the BNTVA in 1990 (probably because he was saying some things of which they disapproved), but he continued his campaign as an individual thereafter. The year before his expulsion he applied for a War Pension on the basis of what he said was "damage to [his] immune system" occurring at Christmas Island in 1958.
751. There is no doubt that he expressed his views with persistence and apparent conviction. In February 1992 an article entitled “Andy the Atomic” appeared in *The People* in which he is quoted as saying his files had been checked and demonstrated that he “had been exposed to quite high levels of radiation - something the Ministry of Defence has never admitted”. The article contained the words “Now I want some action.”
752. Mrs Dickson said this in her witness statement:

“Andrew believed that his health problems might have been caused by radiation exposure during his time on Christmas Island. He was of this view from the mid 1980’s and as his health continued to deteriorate he wondered whether this was part of the continuation of a pattern of radiation related ill health” (My emphasis).

753. The Defendant argues that this of itself evidences the state of belief necessary for the purposes of “knowledge” within the Limitation Act.
754. I have found the evaluation of this case from the point of view of knowledge particularly difficult. Unfortunately, it was not possible to hear directly from Mr Dickson about his approach to these matters, but it seems to me that apart from the skin complaints, he was complaining about conditions that at the time he was complaining of them in the 1980s were normally not regarded as the consequences of exposure to radiation although, as it happens, a number of the more diffuse symptoms might now have been supported by Professor Mothersill and Professor Parker. However, as I have said, generally speaking, many of the health problems he put forward at those earlier times were not normally regarded as the consequences of radiation exposure. The most serious condition (which is the condition from which he died and which had not, of course emerged by the time of his representations in the 80s and 90s) is not in fact supported by Professor Mothersill as something that can be linked to exposure to ionising radiation, although Professor Parker’s report contains the makings of a case in this regard. She says this:

“It has become apparent from recent studies of atomic bomb survivors, occupationally exposed workers and other groups exposed to ionising radiation that the risk of a number of non-cancer outcomes is increased with exposure to ionising radiation. These outcomes include heart disease.

Further recent understanding of non-targeted (bystander effects), proposes a mechanism by which ionising radiation exposure results in a number of chronic inflammatory conditions, including heart disease. Of importance in these effects are that they may not be dose dependent and there is enormous inter-individual variation in the manifestation of these effects.”

755. The conclusion I would have to draw from all the material I have seen in Mr Dickson’s case (which I have not recited in detail in this judgment) is that, whilst he was as justified as anyone else to raise issues and concerns about the health consequences of the tests, he was almost certainly “barking up the wrong tree” at the time in relation to all those (bar, perhaps, the early skin complaints) of which he complained other than the one from which he died. Could this substantially erroneous belief be translated into “knowledge” for the purposes of the Limitation Act? It does seem an absurd conclusion at which to arrive. Whilst I have hesitated before deciding to reject that conclusion because I am mindful of the apparent belief that Mr Dickson had in the cause of his problems, I do not think I can accept that, applying an eventual objective test to the issue of knowledge, he can be said to have acquired knowledge of the attributability of those earlier problems to exposure to ionising radiation at Christmas Island.
756. The one odd feature about Mr Dickson’s case is that apparently he did not seek any legal advice about bringing a claim in relation to any of his conditions. He sought advice from solicitors in 1991 concerning his expulsion from the BNTVA, from other solicitors in the same year to investigate a potential claim arising from the use of benzodiazepines, from other solicitors in 2002 in relation to his War Pension application and from yet another firm of solicitors in 2003 about a possible claim arising from exposure to asbestos. The Claimants’ team submit that he was probably not able to find a solicitor willing to take on his case for radiation exposure, rather than that he simply failing to make any effort to obtain such advice. That is one possibility, though Mrs Dickson was not asked about any attempts he may have made to engage solicitors on this matter. The other is that he knew, whatever he may have been saying in his letters and publicly, that there was no reasonable prospect of attributing his various conditions to ionising radiation. He may, of course, have been keeping an eye on what the BNTVA was doing even though he was no longer a member.
757. Odd though it may seem, but I think it is simply a function of the finding of fact I have to make, Mr Dickson, for all he said, did not have relevant knowledge for the purposes of the Limitation Act until the development of his ischaemic heart disease and that would, as it seems to me, be the position that a reasonable person would have taken. He never received any positive support for what he was asserting and his ischaemic heart disease developed within three years of the commencement of the proceedings in his name and, accordingly, the claim based upon that as a “significant injury” is not statute-barred.
758. Since that is my conclusion, strictly speaking, it is not necessary to say what I would have decided under section 33 had I reached a different view about the issue of knowledge. However, should my conclusion be challenged, I should give an indication of what I would have done.

(ii) section 33

759. For reasons which I do not think I need to repeat (see paragraph 754), as things stand even the case based upon ischaemic heart disease appears to be a weak case on causation. The support at a general level from Professor Parker is hardly enthusiastic. However, that is not really relevant to the alternative scenario that it is necessary to consider for the purpose of considering section 33.
760. That involves considering what attitude I should have adopted if I had concluded that Mr Dickson did have relevant knowledge some 20 years or so ago of, as it would have been then, the attributability of various skin conditions, lethargy, loss of concentration and memory loss and stomach problems/colitis. As I have already indicated (paragraph 754), there was then little support for the attributability of those conditions to exposure to ionising radiation. Given that and the generally diffuse nature of the symptoms, I think I might have been inclined to say that it was not a case that should go forward because the chances of proving a causal link were sufficiently remote for that factor to outweigh the other factors that, in my view, militate in favour of permitting the claims generally to proceed.
761. However, both Professor Parker and Professor Mothersill have now said that the RERF (see paragraph 647) has found evidence of immunocompromise resulting from exposure to ionising radiation and “this can lead to a wide range of diffuse symptoms.” This was not said directly in relation to Mr Dickson’s case, but I do not think I can overlook it simply on that ground: their focus in his case, perfectly understandably, was on the ischaemic heart disease to which I have referred above.
762. All I can say, whatever inner reservations I might feel, is that on that basis I cannot characterise the causation claim as so weak that it is a factor that must be overridden by the factors militating in favour generally of permitting these claims to go forward. The other considerations are those mentioned in paragraphs 572-625.
763. In many respects Mr Dickson’s case is similar to that of Mr Noone (see paragraphs 792-812) in relation to the exercise of the section 33 discretion.
764. Mr Dickson was at the GRAPPLE tests and the matters that I have mentioned in other cases in relation to the position of the Defendant in responding to the claims arising from those tests apply here (see paragraphs 572-625).
765. For those reasons, though not without some hesitation, I think it would have been equitable to have disappplied the operation of section 14 in this case.

(f) ARTHUR HART

766. Mr Hart was born on 8 June 1937 and will shortly be 72 years of age. Whilst there is a history of certain health issues (in particular, multiple lipomas) with which I will deal shortly, the most serious feature was his diagnosis with bowel cancer on 23 July 2002 which led to major surgery and subsequent chemotherapy.
767. In Mr Hart’s case proceedings were commenced on 23 December 2004 with 23 December 2001 being the relevant date for limitation purposes.

768. The Defendant's case is that he had actual knowledge by 1988 or by 1991 at the latest and/or constructive knowledge in 1990 in relation to the lipomas. The case advanced on his behalf is that his date of knowledge was at some point after the diagnosis of bowel cancer in July 2002. This is a case in which potentially the "first injury" issue (see paragraphs 491-497) arises. It was chosen by the Claimants as a Lead Case.

(i) knowledge

769. Mr Hart joined the railways when he left school and was there for a period of three years before doing National Service in the Royal Navy from the age of eighteen. He served throughout as an Engineer Mechanic aboard HMS Diana between January 1956 and August 1957. He was present on HMS Diana at Monte Bello during MOSAIC I and MOSAIC II which took place in May and June 1956.
770. After completing his National Service he reverted to work on the railways, starting out as a booking clerk and working his way up to the position of senior manager. After his retirement from the railways in 1992 he became General Services Manager with Fiat Auto where he continued to work until retirement at 65.
771. Reverting to the material events, his recollection is that the ship's company was told some days before the first test that HMS Diana's role would be to steam through the nuclear fall-out after the detonations. He was cross-examined about his recollection of what he was doing at or about the time of the detonations and thereafter. If this case goes to trial it will be a version of events that will be contested. He alleges, contrary (as the Defendant contends) to the documentary evidence available, that he was outside on the upper deck when the boat passed through the cloud. None of that is, of course, a matter for me.
772. He gave his evidence with a measured dignity and, though he eschewed any intention to be flippant, there was the occasional glimpse of wry humour. There was a hint in what was put to him in cross-examination that he had to some extent "sold himself" to the cause of the BNTVA. To the extent that it matters, I do not think that is so at all. Even if it was so, it would not, of course, disentitle him from proper consideration of his case in relation to limitation on the merits. I thought he was a witness who was doing his honest best to assist me on the material issues in these proceedings subject only to the understandable vagaries of memory.
773. By the time this judgment is handed down he and his wife will have celebrated 50 years of marriage. At the time he went to the tests he was only 18 and, as he said, "extremely junior". He was discharged from the Navy in 1957 and he and his wife married 2 years later. It was soon after his marriage that the first lipoma appeared on the back of his hand and as the years have progressed he has acquired about 100 lipomas over his body. Once the lumps started appearing, he said, they spread from his wrist and forearms down to his abdomen and legs. He regarded them as unsightly and he has always felt embarrassed by them. His wife has been very understanding. They are the proud parents of 5 children and have lived at their present address in Warrington for 35 years or so.
774. I will deal shortly with Mr Hart's view as to the cause of his lipomas, but his attitude, I accept, was that he would not have wanted to go to court simply for the lipomas which, although unsightly, were not interfering with his life.

775. The documents reveal that on 7 January 1988 he received a letter from Jack Ashley MP, as he then was, providing contact details for the BNTVA. It is plain, though Mr Hart could not recall it, that he had written to Mr Ashley on 1 January 1988 for some reason connected with his time at the tests. Something must have caused him to write to Mr Ashley. On 18 January 1988 he wrote to Mrs Sheila Gray (having apparently previously written to the Ministry of Defence and receiving no reply) saying that he was “actually on the upper deck in supposed protective clothing when the ship sailed through the radioactive cloud”. He said that he had “suffered from severe skin problems and unsightly body lumps.”
776. As I have said, what prompted his initial contact with Mr Ashley is unclear and probably does not matter for present purposes. On 21 April 1991 an article appeared in *The People* headed ‘Ship of Doom’ appealing for the crew of HMS Diana to come forward. That article was followed over the next few months by similar articles.
777. In consequence of this Mr Hart made an application for a War Pension and saw his GP on 14 August 1991 to seek support for the application. The basis for his application was “widespread multiple lipomas” which, on the application form, he suggested was “subsequent to exposure to atomic radiation while serving in the Royal Navy”. He gave further details in the following way:

"During the 1956 atomic bomb tests at Monte Bello I was an engineering mechanic on board HMS Diana and was actually on the upper deck when the ship sailed through the radioactive atomic cloud. Prior to Royal Navy discharge I had no health problems. Since discharge I have suffered from severe skin problems and unsightly body lumps, approximately 100 such lumps."

778. Prior to this Mr Hart’s recollection is that he had mentioned the origins of these lumps to his GP and a consultant to whom he was referred on another issue back in the early 1970s, but was reassured that the nuclear tests were unlikely to have contributed to them. As he said, he just got on with his life as he was advised to do by the consultant. His evidence was to the effect that he accepted this, but when he started reading in the press about questions arising in connection with the effect on health of the tests he started wondering whether there may be some connection between lipomas and the tests. It was against that background that he made the application to which I have referred. It was at the suggestion of the BNTVA in accordance with its then policy. He did, of course, confirm that he thought what he was saying in his application was true.
779. He had a brief medical examination, he said, conducted by a Ministry of Defence doctor on 8 September 1993 and a little later he received notification of the rejection of his claim. Its format was very similar to that received by Mr Clark (see paragraph 733 above). There are two paragraphs I will record:

“[Mr Hart] could not have been in the open on the upper deck whilst HMS Diana traversed the radioactive cloud, as he states.

...

[Mr Hart's] exposure to ionising radiations resulting from the UK Atmospheric Nuclear Weapon Test programme, Operation MOSAIC, did not significantly exceed ZERO. It is beyond any doubt that such trivial levels of ionising radiations and other effects from the nuclear tests off Western Australia did not cause, nor contribute to, the multiple lipoma which is not a radiation related disease, and which he now has."

780. It is plain, therefore, that his account of being on deck (which, it has to be observed, he has maintained consistently) was rejected as untrue and that the possibility of exposure to excessive ionising radiation was also rejected, as indeed was any connection between exposure ionising radiation generally and the development of lipomas.
781. The Defendant submits that this period of his life represents a period when he acquired "knowledge" of the attributability of the lipomas to the effects of the tests. Whatever may be said about what Mr Hart said in his pension application (which, incidentally, did not contain any assertion that he "always believed" his lipomas were caused by his presence at the tests), finding as the Defendant invites me to do requires a very odd conclusion. I would need to find that he had acquired knowledge of the attributability of the lipomas to ionising radiation at the time of the test when the Defendant was saying at the time he was in the process of acquiring this knowledge, through its officials, that the proposition was unsustainable on several grounds. Indeed the Defendant continues now to say, through its team of advisers, that it remains unsustainable. Whilst it is possible to see how, theoretically, such a position could arise, I cannot bring myself so to conclude and I do not do so in Mr Hart's case.
782. The highest it can be put, in my judgment, is that Mr Hart entertained suspicions of attributability (and perhaps still does), but was never convinced that the connection had been made out. That seems to me to be consistent with the general circumstances at the time and, I would say, by the nature of the cautious character I assessed him to possess during the period he spent in the witness box. I do not think that his state of mind was ever as far advanced in the direction of belief as to attributability as was that of Mr Clark (see paragraph 732). I am sure he did regard the complaint as "significant" in the sense that it affected him quite significantly; but that is a rather different use of the word "significant" from that required by the Act.
783. For my part, I would not have concluded that Mr Hart has ever possessed (nor would a reasonable person with the same information have possessed) "relevant knowledge" for the purposes of the Limitation Act in relation to the lipomas. If I was wrong about that I would have said that, for limitation purposes, he would have been able to rely upon the bowel cancer, to which I will turn shortly, as the "significant injury".
784. I will address the section 33 issue should I be wrong about those matters (see paragraphs 786-791).
785. I have no doubt, and there is no challenge from Mr Hart on this issue, that once he had time to reflect and take advice upon the bowel cancer that was diagnosed in July 2002 he had acquired "knowledge" in relation to that plainly significant injury. However, that was within the period of three years ending on 23 December 2004 and, accordingly, the claim is not statute-barred.

(ii) section 33

786. If I had to approach Mr Hart's case on the basis that he had relevant knowledge of the attributability of his lipomas to the tests in about 1990, I would have been persuaded that I should exercise the discretion under section 33 in his favour.
787. The Defendant says that all the senior officers on HMS Diana are now dead. Captain Gower died in 2007 (though he had given an account to a representative of Messrs Rosenblatts in 2006), the First Officer in 2005, the Navigating Officer in 1985 and the ship's surgeon in 2006. Another surgeon called Stuttaford has not been traced. It is said that the documentary evidence is insufficient as it does not focus on Mr Hart's precise role on the ship and cannot be used to provide a rebuttal to his allegations.
788. I have already alluded to the substantial amount of documentation relating to Operation MOSAIC and to HMS Diana's role in particular (see paragraphs 593-596). I have to say that, if there are difficulties in responding to Mr Hart's case (which I doubt), those difficulties were probably in existence in the early 1990s in any event. It is true that some of the witnesses would then have been available, but a trial would have been taking place 40 years or so after the material events. Everyone would have been looking to the contemporaneous documentation which, as I have indicated, is voluminous. I cannot see that it is any less easy to consider Mr Hart's allegations now than it would have been then. The MOSAIC operation was considered by the Australian Royal Commission and two of the most senior people involved in its planning gave evidence (see paragraph 596). If what Mr Robin Auld QC, who was acting as the advocate for the Ministry of Defence, said then (see paragraph 334) represented the reality, the prejudice had already occurred. On the other hand, the assertion was not, of course, tested in the way that it could have been had the limitation point been taken in *Pearce* (see paragraph 335) and so it does remain simply an assertion on behalf of the Defendant.
789. As in all the other cases, the burden of proof will be on Mr Hart. The Defendant has asserted that his evidence is unclear on where he was at the time of the detonations which, it is said, is understandable given the passage of time. It is argued that his fading memory is bound to affect his evidence and will make his claim "almost impossible to try". I make no comment about whether his memory is unclear on the matters of importance, but if it is it is something that may operate in the Defendant's favour by making his claim difficult to prove (in contradistinction to being difficult to try). For my part, I do not see this observation as militating against a favourable exercise of the discretion under section 33.
790. For those reasons and for the other reasons given in paragraphs 572-625 above I would, had it been necessary to do so, have permitted the claim in respect of the lipomas to proceed. My preferred view, however, is that the bowel cancer was the "significant injury". Had I been wrong about that and the lipomas were to be considered the "significant injury", I would have permitted the bowel cancer to be made the subject of the claim pursuant to the exercise of the section 33 discretion.
791. I should say that, whilst there is plainly a dispute between the experts about the actual attributability of either the lipomas or the bowel cancer to the effects of ionising radiation, there is support from Professor Parker and it would be impossible to say at

this stage that the causation case in respect of either was doomed to fail. Each is arguable.

(g) CHRISTOPHER EDWARD NOONE

792. Mr Noone was born on the 15 June 1938 and will shortly be 71 years of age. His case was chosen by the Defendant as one for consideration in this case.
793. In his case proceedings were commenced on 23 December 2004 with 23 December 2001 being the relevant date for limitation purposes.
794. He has complained over the years of a number of relatively diffuse symptoms, the most persistent of which appears to have been serious skin problems, the earliest complaint of this nature (which he described as serious acne) going back to 1958.
795. The Defendant's case is that at the very latest, he had actual and/or constructive knowledge in 1983 that his skin problems were attributable to exposure to radiation. The case advanced on his behalf is that he did not have relevant knowledge before 23 December 2001.

(i) knowledge

796. He joined the RAF in February 1956 and served for 10 years until February 1966. He says that his records show that he was posted as an air frame mechanic with the 206 Squadron to Christmas Island on three separate occasions between January - March 1957, April - June 1957 and October - November 1957. The Defendant makes the point that he only spent 7 days on Christmas Island after GRAPPLE X, a fact that evidences, it is said, the weakness of his case on exposure given the "abandonment of a case of prompt radiation." If the case goes to trial, all matters of this nature would have to be examined, but I do not see the immediate relevance of this if, as now appears to be the case, such conditions as are attributable to ionising radiation are likely, it is said, to be attributable to the effects of fall-out. I do not understand why someone could not ingest or inhale radioactive material during a limited period of 7 days. I make no conclusion about that, of course, and Mr Noone may face other difficulties in establishing his case (see paragraph 810), but this particular point made by the Defendant does not seem an obviously strong one.
797. He married in 1960 and he and his wife had 3 children. Unfortunately, the marriage broke down in 1968. He ceased his service in the RAF in February 1966.
798. His medical records do evidence persistent skin problems. On 19 January 1960 a medical board note confirms a history of skin problems for 3 years. None of these early entries refer to radiation, but his evidence was that he did ask various doctors at the time if his problems might be related to radiation exposure. Although he said he raised the issue, it seems that no-one thought there was any connection. His recollection is that one RAF doctor told him that he had a severe form of acne and that it was a "psychological complaint".
799. His skin and other problems (including dental problems) made him become more reclusive. He said that his back was "in a terrible condition for long periods of time and [he] was embarrassed by the smell of the discharge and by its unsightliness." He

said that from the time that he was discharged from the RAF until about 1982 he did not discuss the issue of radiation exposure with anyone. Indeed the first reference radiation exposure in his medical records is on an X-ray form in January 1983 and the first reference to Christmas Island is in April 1983 when mentioned by a Consultant Dermatologist. In his letter to Mr Noone's GP the Consultant said that he presented with "classical hydranitis suppurativa of the axillae and groins with associated acne conglobata ...". He added a PS in these terms: "I don't think his radiation exposure is relevant".

800. During a reclusive period he suffered from periods of depression and in 1977 saw a Consultant Psychiatrist who said that, having seen him over the previous two years with episodes of anxiety and a depressive illness, he had always struck him as being "a rather strange chap [who] suffers from some sort of basic personality disorder ...".
801. Although the advice he received in April 1983 was that his skin complaints were not related to exposure to radiation it does seem that he did not accept that view. On 2 June 1983, when he was taking part in a peace demonstration he was interviewed by *The Guardian* in which the following appeared:
- " ... Chris Noone was one of the RAF personnel 32 miles from the atom bomb blasts on Christmas Island. He was told to stand with his back to the blast and was given no protective clothing. Yesterday he said he had a number of tumours removed from his back as a result and still has a radiation illness."
802. In his evidence he said that he did not use the word "tumours" but "growths", but otherwise that part of the article was accurate. By this time he had become involved with the Molesworth Peoples' Peace Camp following a radio or television interview in which Michael Heseltine, then the Defence Secretary, had stated that the men on Christmas Island had been given adequate protection during the tests. He decided that he wanted to make an active contribution to the movement for nuclear disarmament and remained at the camp for three years.
803. In early 1983 he had applied for a War Pension in respect of his "skin complaints" which he attributed to his service on Christmas Island. He was awarded a pension, but not by reference to radiation exposure.
804. If I judge Mr Noone's case (as I have judged the others) by reference to the contemporaneous material so far as possible, I do not think that there is any real evidence that he truly thought that his skin complaints (which, understandably, he regarded as "significant" as would any reasonable person) were referable to his time at Christmas Island until the early part of 1983. One inference is that he simply jumped on a bandwagon that had started rolling in late 1982 and early 1983 by virtue of the television and press coverage of the Christmas Island issue. The other is that it was this coverage that simply got him thinking about the cause of his long-standing problem and he started asking whether there could be a link.
805. In one sense, I do not have to resolve the question of which it was. I agree with the Claimants' legal team's submission that Mr Noone has spent a great deal of time "obsessing and worrying about the effects of the tests on his health" and, so far as I can judge, that started in early 1983. He appears to have had a similar mindset to that

of Mr Dickson. He received negative advice (as he said “my doctors always told me that I was wrong in my views about radiation exposure”), but there certainly came a time when he convinced himself of a connection between the tests and a number of issues, his skin complaint being the most significant. (I propose to focus on the skin complaint even though I do not think he abandoned his other health problems for the purposes of these proceedings.) Whilst the true position may have been that he did not have a total conviction based upon solid grounds that this was so, there came a time relatively early on when he thought there was a real possibility of a connection. Unlike Mr Dickson’s case, notwithstanding what he (Mr Noone) was being told by the doctors he consulted, there was a known connection between skin complaints and exposure to radiation. To that extent he was not necessarily “barking up the wrong tree” even though he probably entertained the view that exposure at the time of the blast caused the condition.

806. Like Mr Dickson’s case, I have not found Mr Noone’s case an easy one to evaluate. He was a difficult witness to assess because, as I think, he had become obsessed with the whole issue of Christmas Island and, at least for a time, the anti-nuclear campaign. I make no comment, of course, on the rights and wrongs of that viewpoint, but it makes for difficulty in separating out from expressions used those that reflected a genuine belief in an issue concerning his health and those that represented something of a polemical nature. At all events, on 21 February 1986 he told a GP that he has suffered from “multiple sebaceous cysts ? from radiation damage” and on 5 March that year he told his new GP that he suffered “radiation blisters after return from Christmas Island”. If I give some benefit of doubt about the extent prior to then of his true conviction about the attributability of his skin complaints to his presence at the tests, it seems to me that by then at the latest he must be treated as having acquired “knowledge” within the *Snizek* approach (see paragraphs 505-508) to the issue.
807. That is, of course, well before the crucial date for limitation purposes and, accordingly, he will need a favourable exercise of the discretion under section 33 in order to proceed.

(ii) section 33

808. I am inclined to think that a similar analysis to that which I applied to Mr Hart’s lipoma case (if forced to take the lipomas as the “significant injury”) would apply to Mr Noone’s case in relation to skin complaints.
809. I do not see that the delay since 1986 makes any significant difference to the Defendant’s ability to respond to it. The GRAPPLE tests are well documented and well evidenced for all the reasons set out previously (see paragraphs 597-601).
810. I do, however, have to say that, irrespective of any broad expert support there may be for his various other diffuse symptoms if they are still relied upon (e.g. loss of teeth, depression and loss of memory and arthritis), it is going to be difficult for a court to be satisfied, on the balance of probabilities, that they are attributable to exposure to ionising radiation at the time of the tests. There is contemporaneous evidence available (in the form of a letter from a Consultant Dental Surgeon at Stoke Mandeville Hospital dated 12 July 1966 saying that “there is no dental reason why this man should have all his teeth out”, but since he was unwilling to have any dental treatment, the only course was to proceed as he wished) which may undermine his

case concerning his loss of teeth. My view, therefore, is that the causation case in respect of those matters is weak but not so weak that I should decline to disapply the time limit to permit the claims to be advanced. Professor Parker does say this: “Loss of teeth, skin problems and memory loss are all documented effects of exposure to ionising radiation.”

811. Whilst, as I have said, I do have some reservations about the causation aspects of at least some parts of Mr Noone’s claim, I think that the general factors mentioned in paragraphs 572-625 are sufficient to outweigh those reservations for the purposes of section 33.
812. His applications in relation to a War Pension in the early 1990s will have drawn the nature of his complaints to those evaluating such matters.

(h) ERIC OGDEN, deceased

813. The late Mr Ogden was born on 11 May 1934 and died of cancer on 5 August 2004 after a long illness involving metastatic fistulating recurrent colon cancer. The issue is whether he was statute barred from bringing a claim at the date of his death. His case was chosen by the Defendants as one for consideration in this case.

(i) knowledge

814. Mr Ogden had suffered from a number of conditions over the years, including a brain tumour in 1986. The Defendant submits that it is evident that he had already been considering whether his health had been adversely affected by exposure to radiation by then and that after the diagnosis of meningioma in March 1986 his actual knowledge of the attributability of his meningioma to exposure to radiation is “clear beyond doubt”. He was also diagnosed with colon cancer in 1994 and the Defendant submits that he had the requisite knowledge in respect of his colon cancer (as well as his meningioma) in or before April 2001 which was over three years before his death in August 2004. It is submitted on his estate’s behalf that he did not have relevant knowledge at the date of death, but if he moved from suspicion to knowledge when he dictated the written statement in 2003 to which I will refer below, then that itself would be within three years of the death.
815. He was an air wireless fitter with the RAF and a member of the Shackleton ground crew of Squadron 269 engaged in the servicing and testing of aircraft. He spent some time in Australia (where he did not witness any tests, but was involved in reconnaissance duties for Operation ANTLER) and some time on Christmas Island during the GRAPPLE Z tests in August and September 1958. The Defendant draws attention to the relatively short period he spent there. This will be a matter for consideration at any trial, but I would make the same comment here as I did in relation to Mr Noone’s case on this issue (see paragraph 796).
816. By the time Mr Ogden was diagnosed with a brain tumour in 1986, there is no doubt that he had already questioned whether his health had been adversely affected by exposure to radiation. In a letter of 17 October 1983 from a dermatologist the following is noted:

“I note that he has had vitiligo, but I doubt if this is in any way related to his chronic urticaria. He has worked on Christmas Island and he wonders whether he was affected by nuclear fallout and I think this weighs heavily on his mind.”

817. When he made an application for a War Pension in April 1986 and later at the War Pensions Medical Board in November 1986, Mr Ogden asserted that his “benign cyst inside the skull” was caused by “exposure to radiation on Christmas Island 1958”. Mrs Ogden’s evidence is that he told her that a suggestion that had been made to him “that his exposure to radiation might have something to do with the brain tumour”. It was at about this time that he became involved with the BNTVA.
818. Although Mr Ogden had undoubtedly raised the question of the possible influence of his presence at the tests with his problems by this time, I do not consider that raising those questions had caused him to pass the threshold of suspicion or general enquiry into the realms of “knowledge”. Those medical practitioners with whom he had raised the matter had rejected any causal link and, whilst I am sure he maintained his suspicions, he does not appear to have reached the position of conviction reached by, for example, Mr Clark. This would, in my view, have been the position reached by a “reasonable person” possessed of the information that he had, information that included negative medical advice that, in the circumstances, it was reasonable for him to have sought.
819. Mr Ogden subsequently had the major misfortune of being diagnosed with cancer of the colon in January 1994. He survived (bravely) for 10 years following that, for the first 5 of which he continued working. After his retirement he made another application for a War Pension, on this occasion basing the application both upon the brain tumour and the colon cancer. He contacted Mr Ian Greenhalgh, a solicitor who was helping the BNTVA with the pension applications. It appears that Mr Greenhalgh helped with the preparation of the application for the pension and then the preparation of the appeal following the rejection of the application. It appears that the statement referred to in paragraph 817 above was prepared in connection with this appeal. The statement was undated, but was probably prepared in early 2003. It contained an account of Mr Ogden’s time on the island with the familiar story of what happened when the tests took place.
820. The original application had been made on 12 April 2001 and in reply to the question “How and where did you get your illness, disease, deafness or other condition?” Mr Ogden replied “Witnessing hydrogen bomb tests on Christmas Island 1958”. In a later part of the application document, where his own statement and history was set out, he made further reference to being “a witness to the explosions” and said that he was only wearing shorts at the time. He made reference to the fact that he swam in the sea and ate the fish caught locally.
821. As will be apparent from other cases, I have not been persuaded that merely putting in a pension application has been sufficient to evidence “knowledge” in all circumstances. However, I think that this second application, prepared with advice and with some care, does demonstrate a firm belief by this time that his cancer (and, of course, by now the brain tumour) were attributable to the exposure to ionising radiation at Christmas Island, including, it appears, exposure from eating locally

caught fish and swimming in the sea. I consider that a reasonable person with the information available to him would have been of the same state of mind.

822. Whilst, as I have said previously (paragraphs 514-521), my preferred view is that knowledge would not have been gained in this situation, I believe I must conclude that these facts were sufficient for knowledge to have been acquired. It was probably a little while before the submission of the application for the pension in April 2001, but whatever date it was prior to that it was before the cut-off date for limitation purposes of 21 December 2001.
823. It follows, therefore, that the claim was statute-barred at the date of Mr Ogden's death. For the claim to proceed, it will be necessary for a favourable exercise of the discretion under section 33.

(ii) section 33

824. If the foregoing analysis is correct, I doubt that it could seriously be argued that a delay of less than 1 year should prevent a favourable exercise of the section 33 discretion. Mr Ogden would have acquired relevant knowledge about 1 year earlier than Mrs Brothers and Mrs Clark. It would be inequitable, in my view, for those claims to be able to proceed and that of the late Mr Ogden not to do so unless there were clear and obvious reasons.
825. However, the issue that needs to be addressed is whether, if the Defendant's argument is correct and he had actual knowledge in 1986, I should have disapplied section 14. Mr Ogden must, on this basis, been treated as having been about 15 years out of time.
826. It is true, as the Defendant contends, that no reason has been advanced for that delay, but it presupposes an acceptance that there was a delay which, of course, it is said on Mr Ogden's behalf there was not. During that time he was making such inquires as he could against the background of having to deal with a serious illness. The real issue seems to me to be reduced to the question of whether there is a reasonable prospect of a fair trial of the factual issues underlying the GRAPPLE Z tests. For reasons I have given elsewhere (see paragraphs 597-601), I do not see why this should not be so.
827. There is an additional factor in Mr Ogden's case that needs to be taken into account. He applied for a War Pension in 1986 (see paragraph 817) which had the effect of drawing his case to the attention of the Defendant. There is a letter from the DHSS to AWRE dated 5 August 1986 in which AWRE's attention is drawn to the fact that he was claiming that his problems at the time were due to exposure to radiation on Christmas Island between July and October 1958. There was no difficulty in responding to his application then, nor to a subsequent application for a review in 2001. A point made by the Defendant, however, is that it would not now be possible, given Mr Ogden's death, for him to give the particulars said to be necessary for an understanding of how close he was to "contaminated aircraft". I have no way at this stage of being able to judge whether nearness to "contaminated aircraft" is central to the claim to be advanced on Mr Ogden's behalf other than to say that, whilst its relevance can readily be identified, it is not the sole means by which it will be argued that he may have been exposed to ionising radiation. However, my observation is that, if the point is an important one, it merely reinforces the proposition that the

Defendant's position in this litigation is not prejudiced given where the burden of proof lies.

828. On the question of causation Professor Mothersill says that "exposure to low dose ionising radiation materially increased the risk of ... developing meningioma and cancer of the lower bowel" and Professor Parker draws attention to the conclusion of UNSCEAR 2006 which is that the available evidence "continues to indicate that colon cancer is inducible by ionising radiation, compatible with a linear dose response." The issue appears to be arguable and not dissimilar to the situation in Mr Hart's case (see paragraph 791).
829. For all these reasons, including the more "generic" matters referred to in paragraphs 572-625 above, I would have said that this was a case where section 14 should be disappplied even if it be held that Mr Ogden had relevant knowledge some years ago.

(i) PITA ROKORATU

830. Mr Rokoratu is a citizen of Fiji. It will be recalled (see paragraph 99) that the Defendant does not admit owing him a duty of care. He was born on 14 September 1936 and is now 72. He speaks some English, but gave his evidence with the help of an interpreter.
831. In his case proceedings were commenced on 23 December 2004 with 23 December 2001 being the relevant date for limitation purposes. His case was chosen by the Claimants.

(i) knowledge

832. He too has complained of a number of health issues over the years. It is accepted on his behalf that his claim is probably *prima facie* statute-barred, but nonetheless the exercise of the discretion under section 33 in his favour is sought. The Defendant contends that his date of knowledge, constructive if not actual, was "by the early 1990s" or, alternatively, actual knowledge in 1997/1998. It is contended on his behalf that his date of knowledge occurred at some point after 1998 but "probably before 23 December 2001", the suggestion being that "he did not have relevant knowledge until at least the late 1990's" after being provided with information by the PCRC. ('PCRC' stands for the Pacific Concerns Resource Centre, based in Suva, Fiji, which serves as the secretariat for the Nuclear Free and Independent Pacific (NFIP) Movement and acts for a number of affiliated Pacific non-government and community organisations. Mr Rokoratu described it as "an association that is formed against – ban the bomb or things like that in the world".)
833. Since it is conceded that Mr Rokoratu will be dependent on a favourable exercise of the section 33 discretion, the purpose of the "knowledge" debate is purely to determine the length of the delay between the end of the limitation period and the commencement of the proceedings. Since the reality, in my view, is that (a) the constructive knowledge case in relation to hair loss, bowel problems and lipomas "by the early 1990s" simply does not run in Mr Rokoratu's case and (b) the actual knowledge issue makes a difference, if at all, of no more than a few years, I will endeavour to deal with this issue very shortly.

834. In 1956 he joined the Fijian Royal Naval Volunteer Reserve. He worked during the week training as a clerk and at weekends he would train with the Navy. He was in the Naval Reserves for a total of four years during which time he went to Christmas Island for the GRAPPLE Operations between 19 August 1958 and 18 August 1959. He went there, along with others, as replacements for other Fijian soldiers and Navy men who were there at the time.
835. On arrival at Christmas Island he was stationed at Port of London and his main role, he says, was as a stevedore which involved transporting equipment and supplies from British ships onto the island because there was no wharf at which large ships could dock.
836. His recollection was that he and his colleagues were roughly 15-20 miles away from the three detonations that took place whilst he was there. In his witness statement, which he adopted as his evidence, he gave a similar account to that of others (and as is demonstrated on some of the video clips I have seen) that, at the time of each detonation, they had their hands firmly over their eyes, but could see the brightness of the flash through their hands and then felt intense heat on their backs. They were then able to turn around to look at the bomb.
837. Whilst I suspect this next matter may be the subject of questioning at any trial if it takes place, he said that he “saw the seawater bubbling and the coral, with the sand, [being] sucked up into the middle of the huge cloud.” He described the weather on Christmas Island as very hot and windy, but said that there was a very heavy downpour for about three hours after the tests apart from which it rarely rained. He said that in their spare time they would go swimming and fishing regularly. They also played soccer and drank lots of coconut milk and the desalinated water that was provided. This mirrors the general account given by others.
838. He returned to Fiji in 1959 and was discharged from the Navy almost immediately since the government was facing financial problems as a result of which the military was downsizing its personnel. He then joined the Marines department where he spent four years before becoming a prison warden.
839. The history of Mr Rokoratu’s various health issues is a little difficult to piece together. Very limited medical records have been available at the trial and the history has emerged through a number of statements made and interviews conducted for various purposes at various times.
840. In short, he says that at various times over the years he has experienced premature hair loss, stomach and bowel problems, lipomatous growths, anaemia and arthritis. (At one stage it was claimed that he had suffered aplastic anaemia, it seems on the basis that a Dr Bakani diagnosed it, but it has been accepted that he could not possibly have been suffering from so serious a condition.) He says, and I have no reason to doubt it, that the first time it crossed his mind that his various health problems might have been related to his time on Christmas Island was when Losena Salabula, a lawyer associated with the PCRC and Ian Anderson (the lawyer who helped Mr McGinley with his application to the European Commission of Human Rights: see paragraph 694) contacted him although he never actually met Mr. Anderson. It appears that Mr Anderson was looking for some support for Mr McGinley’s application at that time.

841. This contact appears to have been made in 1997 and on 19 September 1997 Mr Rokoratu signed a statement in Mr McGinley's application in which he suggested that he had suffered loss of hair, aplastic anaemia and leucopenia, multiple and extensive lipomatous growth all over his body, short-sightedness and blurring of vision. He also asserted that his wife had two miscarriages in 1961 and 1963 and that his only two male children also had extensive lipomatous growth "all over their bodies". Doubtless drafted on his behalf it asserted as follows: "My children, grandchildren and I have no effective means of obtaining compensation for the illnesses and conditions which we suffer from."

842. The following year, on 28 October 1998, he issued his own application to the European Commission of Human Rights alleging that he suffered injury as a result of exposure to radiation on Christmas Island and this appears to have been supported by Dr Bakani, a Consultant Physician/Cardiologist, who on 9 November 1998 (two days after an examination and consultation) recorded his findings and conclusions, after recording Mr Rokoratu's work history, as follows:

"1968 Tiredness, lethargy and unable to cope with others. Developed lipomatosis in skin of trunk, upper limbs and abdomen. 1975 sizeable ones surgically removed.

Examination – Premature aging. BP 160/90. Heart shows mitral valve regurgitation. Scores of variable sizes of lipomatous lesions in trunk, abdomen and both arms. Blood tests (1997) showed mild anaemia with aplasia and borderline leucopaemia.

It is my view that the above findings are likely to be linked to exposure and hazards of nuclear bomb tests in 1958. The changes are likely to be permanent and irreversible."

843. Mr Rokoratu said in his evidence that what Dr Bakani said to him really did confirm the link between his problems and the tests.

844. Whilst efforts were made on Mr Rokoratu's behalf to suggest that this was not a fair basis for reaching a view about his state of mind at the time, I do not see any realistic way in which what he said can be circumvented. He did sign two separate documents, themselves separated by a year, which contained the same essential message. I did not assess him to be an unintelligent man who did not know what he was doing at the time. If I give some benefit of the doubt I would have to conclude, on the basis of the analysis of the authorities that governs my decision, that he had crossed the threshold into the arena of "knowledge" by no later than the end of 1998. On the basis of the information available to him, I consider that a reasonable person with that knowledge would have been of the same mind.

845. It follows that, as conceded, he will need a favourable exercise of the section 33 discretion for his claim to proceed.

(ii) section 33

846. If I am wrong and he is to be said to have acquired constructive knowledge in the early 1990s of the attributability of hair loss, bowel problems and lipomas to the tests,

the delay would be some 10 years or so. There is unchallenged evidence before me that “Fijians are not by culture litigious”. Whilst it is true that Mr Rokoratu did get involved in an application to the European Commission on Human Rights, I do not think that that undermines the general nature of the evidence given on this issue. However, objective standards govern much of what has to be considered under section 33 although a factor such as this could be taken into account as one of “all the circumstances of the case.”

847. Whilst I think it is, therefore, something to which attention needs to be paid in a broad sense, overall I am not persuaded that it ought to be accorded too great a significance. It is rather a broad brush assertion that may or may not apply to a particular individual whose application to disapply section 14 is under consideration.
848. The conclusion to which I have come means that Mr Rokoratu is about 3 years out of time. If I was wrong in my conclusion, and it was held that he had constructive, if not actual, knowledge by the early 1990s, the issue is whether I would have felt it appropriate to exercise the section 33 discretion in his favour.
849. Having reached this stage in the judgment, it will be appreciated that, subject to any particular factors affecting his individual case, I would have been disposed to do so. He was on Christmas Island for a year and thus potentially susceptible to ionising radiation caused through fall-out. He is, therefore, in no different position from others in this litigation – indeed, if his evidence is accepted, he spent longer there than some others.
850. His causation case does, however, present some difficulties as it stands. As I have indicated, piecing together the precise sequence of events is not easy and the medical records are incomplete. The diagnosis of one of those who has seen him in the past has been recognised to have been erroneous and some of the more diffuse symptoms of which he has complained (including tiredness and lethargy), whilst capable of being attributed to the effects of ionising radiation, could readily be attributed to other causes. Whilst, as with all cases, I have not been disposed to characterise his causation case as “doomed to fail”, as thing stands it may present some difficulties. However, as I observed in other cases, that may present a difficulty to Mr Rokoratu – it may not operate as a prejudicial factor so far as the Defendant is concerned. I would not conclude that this factor outweighs the more “generic” factors referred to in paragraphs 572-625 above and, on balance, I would have been in favour of exercising the section 33 discretion to permit the claim to proceed.

(j) BERT SINFIELD, deceased

851. The late Mr Sinfield was born 9 November 1938 and died on 30 March 2007. His case was chosen by the Claimants as a Lead Case.
852. The deemed date of issue of proceedings in this case is 1 February 2007. The issue is whether the claim was statute-barred as at that date – in other words, did the late Mr Sinfield have relevant knowledge by 1 February 2004.

(i) knowledge

853. The Defendant contends that Mr Sinfield had actual and/or constructive knowledge of the attributability of his anaemia (which the Defendant describes as a “mild form of iron deficiency anaemia”) to the tests by about 1992 when he visited a “well man” clinic and gave an occupational history of having worked on Christmas Island. It is said on behalf of his case that he could not have had relevant knowledge prior to the diagnosis of non-Hodgkin’s lymphoma on 21 October 2005.
854. He joined the Royal Army Services Corps as a national serviceman in 1957 and went to Christmas Island in June 1958. He was there during the GRAPPLE Z series of tests during August and September 1958 and returned to the UK in June 1959.
855. He was discharged from the Army in November 1959 and married his wife in March 1963.
856. The precise date is unclear, but it appears that Mr Sinfield was diagnosed with anaemia in 1973. This came to light because he was rejected as a blood donor on several occasions because of low levels of haemoglobin. Although Mr Gibson sought valiantly to suggest to Mrs Sinfield that she and her late husband had attributed the anaemia to his presence at the tests, there really was no true foundation for the suggestion. She said, and there is no reason to doubt it, that her husband was generally very well. It would seem that the anaemia was not something he regarded as significant and, I might add, I am not at all sure that a reasonable person who had attributed it to the tests would have seen it as worth pursuing in litigation against a compliant defendant. The only occasion prior to 2004 when there was a reference to Christmas Island and his anaemia was in a GP’s note in 1992 when Mr Sinfield went to the first “well-man clinic” with a new GP. The note read “anaemia in the past – unable to get any blood. Rev[iew] if symptoms occur...1958 – 59 worked on Christmas Island for a year”. I do not think that any reasonable construction of that note connotes a connection being made by Mr Sinfield or by his GP between his past anaemia and his presence at the tests. It was merely a narrative history.
857. In a number of cases the Defendant has argued that the making of an application for a War Pension evidences relevant knowledge within the Limitation Act. My views as to that submission are clear (see paragraph 525). However, it is to be noted that at no stage did Mr Sinfield ever apply for a War Pension in connection with his anaemia. That, in my view, adds confirmation to the conclusion referred to in paragraph 856 above and reinforced in paragraph 858 below.
858. It is true that Mr Sinfield in February 1984 wrote to the NRPB asking to be included in their Health Study (see paragraph 352), but so did very many others and there is nothing in the contemporaneous documentation to suggest that he had made the link contended for by the Defendant. It was not until 14 October 2004 that Mr Sinfield’s GP noted that his anaemia seemed to be a recurrent problem and added “had [full blood count] as was worried about his exposure to radiation on xmas island when he was working there”. It would seem, therefore, that this is the first occasion when the link was made, but even then it was probably only an unsupported suspicion. It does not matter, however. Even if the link was made for “knowledge” purposes and it was to be treated as significant, it would have been within time.
859. It is conceded that if the significant injury is the non-Hodgkin’s lymphoma, then the claim is in time.

860. For the reasons I have given, I consider that relevant knowledge of both conditions was not obtained until within 3 years before the commencement of the proceedings. If I should be wrong about that, I will deal with the notional section 33 discretion.

(ii) section 33

861. On the basis I have to consider for this purpose, the issue is whether I would have been disposed to exercising favourable discretion under section 33 if Mr Sinfield had relevant knowledge of the attributability of his anaemia to the tests in 1992.

862. Unlike Mr Rokoratu his medical history is clear so that there would, in my view, be no difficulty in responding to such a causation case as would be advanced.

863. He was at the GRAPPLE Z tests and, for reasons I have already given (see paragraphs 597-601), I do not consider that the Defendant would not be able to respond to the case presented on his behalf in relation to exposure to ionising radiation.

864. For those reasons, briefly expressed, and for the more “generic” reasons referred to in paragraphs 572-625 above, I would have exercised a favourable discretion under section 33.

865. Whilst it is not, strictly speaking, relevant to this issue, I should say a word about the causation case if, for any reason, the question of section 33 should arise in connection with the claim in respect of non-Hodgkin’s Lymphoma. I have not, of course, struck out any claim on the basis that the causation issue is “doomed to fail”. However, in terms of apparent strength of this claim, on the evidence as it stands, it seems to me to be arguable, but not overwhelmingly so. Professor Mothersill says that “exposure to ionising radiation materially increased the risk that Mr Sinfield would develop ... non-Hodgkin’s Lymphoma” and Professor Parker, by reference to UNSCEAR 2006, says that whilst the relation between “lung cancer and ionising radiation is established ... that with non-Hodgkin’s Lymphoma is more equivocal.” It does need to be recalled that one of the conditions at the forefront of the case of *Hope & Reay v British Nuclear Fuels Limited* (see paragraph 295 above) was non-Hodgkin’s Lymphoma. That case was, of course, decided on the basis of scientific and medical evidence that must now be at least 15 years out of date.

866. The fact that I can only characterise the causation case as arguable on the evidence as it stands would not, in my view, have militated against disapplying section 14 given the other factors I have identified.

20. Overall conclusion in Lead Cases

867. The net effect of my analysis of each of the Lead Cases is that the cases of Mr Ayres, the late Mr Brothers, the late Mr Dickson, Mr Hart and the late Mr Sinfield are not statute-barred. Those of Mr McGinley, the late Mr Clark, Mr Noone, the late Mr Ogden and Mr Rokoratu are statute-barred.

868. The Defendant had argued that all ten cases were statute-barred and of those chosen by the Defendant, the Claimants accepted that the late Mr Clark’s case was statute-barred. I have accepted that all the cases chosen by the Defendant (with the difficult exception of the late Mr Dickson) were statute-barred. Of the five cases chosen by

the Claimants, I have accepted that four were not statute-barred, the fifth (Mr Rokoratu's case) having been conceded to have been statute-barred.

869. In all cases that I have found statute-barred or where the case has been conceded to be statute-barred, I have exercised the discretion to disapply section 11. In those cases that I have found not to be statute-barred I have said that, if my decision on that issue was wrong, I would have exercised the discretion to disapply section 14.
870. The overall result, if these conclusions stand, is that these claims can proceed to trial.

21. Broad concluding observations

871. I do not, of course, know whether this judgment will represent the final word on the limitation issues. If it does, and the cases proceed to trial, I am anxious that this judgment is not portrayed in a way that creates a false dawn. I have merely decided, in effect, that the Limitation Act should not operate as an obstacle to the case proceeding. As I said at the outset of this judgment (see paragraph 6), my task has necessarily involved making some assumptions that may, in due course, prove to have been unfounded when all the material is analysed at a full trial. Equally, there are some areas where it has been necessary to express a tentative view on the merits of certain arguments. I have concluded, for example, on the basis of the material before me that the Defendant faces a case to answer on the issue of monitoring and the validity of the records of exposure to ionising radiation upon which reliance has been, and is being, placed. Even if those records are shown ultimately to have been less accurate than claimed, everything that happened at the time of the tests will have to be judged by the standards of the day for the purpose of deciding whether, in the context of the law of negligence, there was a breach of duty. Furthermore, whilst I have not considered it appropriate to strike out any of the causation claims on the basis that they are "doomed to fail", I have had to express some reservations about the strength of certain of the claims. In the very broadest sense, on the basis of the material as it stands, those conditions or illnesses (particularly those of an identifiable cancerous nature) that can be attributed to chromosomal translocations or other chromosomal changes will probably have a better prospect of succeeding on the issue of causation than claims based upon a collection of diffuse symptoms with no such association.
872. I make these observations because, despite the unique nature of the background to this case, it comes before the Court as a group personal injuries action.

22. Resolution of the case/mediation

873. As I have said, I do not know whether this judgment will be the final word on the issue of limitation. If it is, or it remains substantially so, I would not wish to part with the case without making one further observation.
874. In a sense the observation is premature and would normally arise only during the case management stages of the full action. However, having "lived with" the issues in this case for a number of months, and having some personal experience as a mediator before my appointment as a judge, I hope I may be permitted to offer this comment. Plainly, as a pure piece of personal injury litigation, there are strengths and weaknesses on each side and areas where there are significant risks and areas where the risks are less. With the experienced teams on each side, I am quite sure that that

litigation landscape has already been identified. Against that background, thoughts will (or certainly ought to) turn to settlement. Bearing in mind that most living Claimants are in their 70s, the sooner that the issue is addressed, the better – consistent, of course, with the parties being properly in a position to discuss matters.

875. I have not been pressed in argument with issues concerning the value of any of the claims if permitted to proceed. I am not, therefore, really in a position to make any evaluation other than to observe that I suspect for many who have lent their names to this litigation, substantial monetary compensation is not the goal.
876. Whether that conclusion is correct or not, a resolution of this litigation may demand a solution outside the normal parameters of a personal injury action. Some “thinking outside the box” may be required with a flexibility of approach that is not always available when addressing a case purely on the basis of deciding how much an individual Claimant is entitled to or ought sensibly to accept in settlement. Mediation may be the way forward and I commend it to the parties. The Government is, of course, pledged to settle legal cases by alternative dispute resolution in all suitable cases whenever the other party agrees to it. In my view, this is such a case.

23. Ministerial Statement on 21 April 2009

877. I heard the evidence and argument in this case between 21 January and 6 February. I announced at the conclusion of the hearing that I needed time to consider the substantial amount of material put before me (see paragraphs 94-96) and that I would not be in a position to give a judgment until at least after the Easter vacation.
878. On the 21 April the Minister for Veterans and Under Secretary of State for Defence made a Ministerial Statement to Parliament and on the same day a Press Notice was issued relating to the Ministerial Statement. The Statement related to the general position of the veterans with which this case is concerned. My attention was drawn to both the Statement and the Press Notice by a communication from the Claimants’ solicitors on 23 April. The following day I was told that the parties intended to put before me some written submissions concerning these matters. I received these submissions on 6 May.
879. For convenience the terms of the Ministerial Statement and associated Press Notice are attached as Appendix B to this judgment. My provisional view, when I first read each of them on 23 April, was that I should not be influenced by them, one way or the other, and that what may be happening at a Governmental level was not my concern: my task was to evaluate the evidence and argument in the proceedings before me – no more and no less than that. Since forming that provisional view, the view has been confirmed having seen the written representations of each party.
880. I am grateful for those representations, but I propose to say nothing further on the issue save to make this clear: whilst the draft judgment was very well advanced by 23 April, it was not complete. Nothing within it that could arguably be related to the Ministerial Statement has been changed in the light of the Statement. In particular, the conclusions set out in paragraph 439 have remained exactly as drafted some while ago.

24. Parting observation

881. As I indicated earlier, if this judgment remains the final word on the issue of limitation, it is to be hoped that serious efforts towards settlement will take place at an appropriate time and that a trial of the issues can thus be avoided. If, however, those efforts fail and the consequence is that each veteran has his 'day in court', it will surely be an occasion when, borrowing some of President Truman's words of 6 August 1945 (see paragraph 13), Earthly justice must confront the basic power of the Universe.

25. Expressions of thanks

882. At the conclusion of the argument I expressed my gratitude to both legal teams for their considerable assistance. An immense amount of hard work had been done on both sides to be able to bring the case before the Court. I repeat those thanks and would add that the co-operation between Mr Browne and Mr Gibson to ensure that the hearing took place within the timetable I had to stipulate was also much appreciated.

883. Again, at the conclusion of the argument I expressed by thanks to Mr Niall Maclean, who acted as my marshal during the hearing and who assisted in dealing with the many bundles of documents to which it was necessary to refer. I repeat those thanks and add an expression of gratitude to him (and to others) for proof-reading the draft judgment before it went to Counsel for their consideration.

884. Finally, my thanks are due to my Clerk, John Allan, for typing large tracts of the judgment and in the process of doing so grappling manfully with the unfamiliar topics of nuclear physics and cytogenetics.

885. The final form and content of the judgment, of course, remain my sole responsibility.

APPENDIX A

GENERAL

Number of Core Participants:	114	100.0%
Number known to be dead:	78	68.4%
Number known to be alive:	11	9.6%
Number of whom it is not known if they are alive or dead:	25	21.9%
Number known to have died before 1/1/1986:	22	19.3%
Number known to have died 1/1/1986 to 31/12/1988:	12	10.5%
Number known to have died 1/1/1989 to 31/12/1991:	7	6.1%
Number known to have died 1/1/1992 to 31/12/1996:	9	7.9%
Number known to have died 1/1/1997 to 31/12/2004:	20	17.5%
Number known to have died from 1/1/2005 onwards:	8	7.0%
Of those of whom it is not known if they are alive or dead, average age (where DOB is known):	88.25 years	

HURRICANE

Number of Core Participants on HURRICANE:	33	100.0%
Number known to be dead:	24	72.7%
Number known to be alive:	1	3.0%
Number not known if they are alive or dead:	8	24.2%
Number known to have died before 1/1/1986:	4	12.1%
Number known to have died 1/1/1986 to 31/12/1988:	3	9.1%
Number known to have died 1/1/1989 to 31/12/1991:	4	12.1%
Number known to have died 1/1/1992 to 31/12/1996:	5	15.2%
Number known to have died 1/1/1997 to 31/12/2004:	6	18.2%
Number known to have died from 1/1/2005 onwards:	2	6.1%

MOSAIC

Number of Core Participants on MOSAIC:	34	100.0%
Number known to be dead:	27	79.4%
Number known to be alive:	3	8.8%
Number not known if they are alive or dead:	4	11.8%
Number known to have died before 1/1/1986:	6	17.6%
Number known to have died 1/1/1986 to 31/12/1988:	4	11.8%
Number known to have died 1/1/1989 to 31/12/1991:	3	8.8%
Number known to have died 1/1/1992 to 31/12/1996:	6	17.6%
Number known to have died 1/1/1997 to 31/12/2004:	4	11.8%
Number known to have died from 1/1/2005 onwards:	4	11.8%

BUFFALO

Number of Core Participants on BUFFALO:	44	100.0%
Number known to be dead:	28	63.6%

Number known to be alive:	5	11.4%
Number not known if they are alive or dead:	11	25.0%
Number known to have died before 1/1/1986:	10	22.7%
Number known to have died 1/1/1986 to 31/12/1988:	4	9.1%
Number known to have died 1/1/1989 to 31/12/1991:	6	13.6%
Number known to have died 1/1/1992 to 31/12/1996:	5	11.4%
Number known to have died 1/1/1997 to 31/12/2004:	3	6.8%
Number known to have died from 1/1/2005 onwards:	0	0.0%

Lecturers at BUFFALO

Number of Core Participants who lectured the Indoctrinee Force on BUFFALO:	17	100.0%
Number known to be dead:	8	47.1%
Number known to be alive:	1	5.9%
Number not known if they are alive or dead:	8	47.1%
Number known to have died before 1/1/1986:	2	11.8%
Number known to have died 1/1/1986 to 31/12/1988:	1	5.9%
Number known to have died 1/1/1989 to 31/12/1991:	1	5.9%
Number known to have died 1/1/1992 to 31/12/1996:	2	11.8%
Number known to have died 1/1/1997 to 31/12/2004:	2	11.8%
Number known to have died from 1/1/2005 onwards:	0	0.0%

GRAPPLE Z 1958

Number of Core Participants on GRAPPLE Z:	43	100.0%
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Number known to be dead:	31	72.1%
Number known to be alive:	8	18.6%
Number not known if they are alive or dead:	4	9.3%
Number known to have died before 1/1/1986:	7	16.3%
Number known to have died 1/1/1986 to 31/12/1988:	6	14.0%
Number known to have died 1/1/1989 to 31/12/1991:	4	9.3%
Number known to have died 1/1/1992 to 31/12/1996:	3	7.0%
Number known to have died 1/1/1997 to 31/12/2004:	8	18.6%
Number known to have died from 1/1/2005 onwards:	3	7.0%

APPENDIX B

MINISTRY OF DEFENCE

Nuclear Test Veterans' Health Research

The Minister for Veterans and Under Secretary of State for Defence (Mr Kevan Jones):

The Government has been actively engaging with the concerns expressed by our nuclear test veterans that they and their offspring have been adversely affected by their participation in the British nuclear tests of the 1950s and 1960s.

The wider published peer-reviewed epidemiological evidence to date has not demonstrated a general link between veterans' ill-health and participation in the tests. Similarly there is no peer-reviewed evidence suggesting that their children and grandchildren are at increased risk of genetic abnormalities.

The Government is, however, determined to address the ongoing concerns of nuclear test veterans. I had a constructive meeting with the British Nuclear Test Veterans Association (BNTVA) and interested MPs on Monday 20 April. I am pleased to report that the BNTVA have agreed to help identify a representative sample of veterans and their descendants with a view to conducting an assessment of their health needs. I therefore announce today an intention that the Ministry of Defence will work with veterans and experts to finalise the details of research to investigate the particular health needs of nuclear test veterans and their

offspring with a view to identifying priorities and taking action to improve health. I also intend some follow-up to last year's New Zealand chromosome study. The aim will be for projects to be of practical relevance to veterans with results delivered to a reasonable time scale. The work will be tendered in the normal manner and should be underway before the end of this year. A working group including representatives from the BNTVA will be established to take these projects forward.

PN080/2009

21 April 2009

MOD ANNOUNCES RESEARCH INTO NUCLEAR TEST VETERANS' HEALTH NEEDS

The MOD announced today that it will be conducting an assessment of the health needs of nuclear test veterans and their descendants in a move welcomed by the British Nuclear Test Veterans Association (BNTVA).

MOD experts will join representatives from the BNTVA and MPs to form a working group designed to finalise details of this research and identify a sample group to study.

Veterans Minister Kevan Jones said:

“I am determined to address the ongoing concerns of nuclear test veterans and their families. To that end, I am extremely pleased to announce that we will be undertaking a project to investigate the particular health needs of the nuclear test veterans and their descendants. This work will enable us to ensure that this group are getting the best care possible and identify where any improvements can be made.”

The MOD will also follow up on last year's New Zealand chromosomal study. This work is in the planning stages but the aim is to create a study that will provide veterans with practical, relevant and timely results.

It is hoped that these research projects will both be underway by the end of this year.

Notes to Editors:

1. Between 1952 and 1958 the UK conducted a total of 21 atmospheric nuclear tests in Australia, and at Malden Island and Christmas Island in the Pacific Ocean in the 1950s. Some 28,000 UK Service personnel were involved in the test programme.
2. This and previous Government's frequently stated position is that there is no evidence of excess illness or mortality amongst the veterans as a group which could be linked to their participation in the tests or to exposure to radiation as a result of that participation. Formal and well-documented procedures were in place to ensure the health and safety of those participating in the tests. Personnel Safety Plans were prepared and used for each operation and environmental monitoring was undertaken. Personal monitoring and protective clothing was used where appropriate for each trial. The effectiveness of these procedures is demonstrated by the fact that the majority of participants received little or no additional radiation exposure as a result of participation.
3. This is borne out by three studies into cancer incidence and mortality amongst nuclear test participants conducted by the independent National Radiological Protection Board (NRPB). The latest Report NRPB-W27 entitled “Mortality and Cancer Incidence 1952-1998 in UK Participants in the UK Atmospheric Nuclear Weapons Tests and Experimental

Programmes” published in 2003 concluded that overall levels of mortality and cancer incidence in the nuclear weapons test participants have continued to be similar to those in a matched control group, and for overall mortality to be lower than expected from national rates. Cancer is the predominant marker of ill health caused by exposure to ionising radiation. The one exception is the suggestion especially in the first study that leukaemias, other than chronic lymphatic, are more common in participants in the first twenty five years after participation.

4. The UK Government recognises the vital contribution service personnel played in the UK’s nuclear tests during the 1950s and understands its obligation to veterans. When compensation claims are received they are considered on the basis of whether or not the Ministry of Defence has a legal liability to pay compensation. Where there is a proven legal liability compensation is paid.
5.

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