

IN THE HIGH COURT OF JUSTICE  
QUEEN'S BENCH DIVISION

1990 R No 860  
1989 H No 3689

ROYAL COURTS OF JUSTICE  
 THE STRAND  
 LONDON

Monday 23rd November 1992

Before

THE HON. MR JUSTICE FRENCH

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ELIZABETH REAY

Suing on her own behalf and as  
Mother and Administratrix of the  
Estate of DOROTHY REAY (deceased)  
and as Widow and Administratrix of the Estate  
of GEORGE REAY (deceased) (Plaintiff)

v.

BRITISH NUCLEAR FUELS plc (Defendants)

AND

VIVIEN JANE HOPE (Plaintiff)

v.

BRITISH NUCLEAR FUELS plc (Defendants)

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APPEARANCES:

For the Plaintiffs:

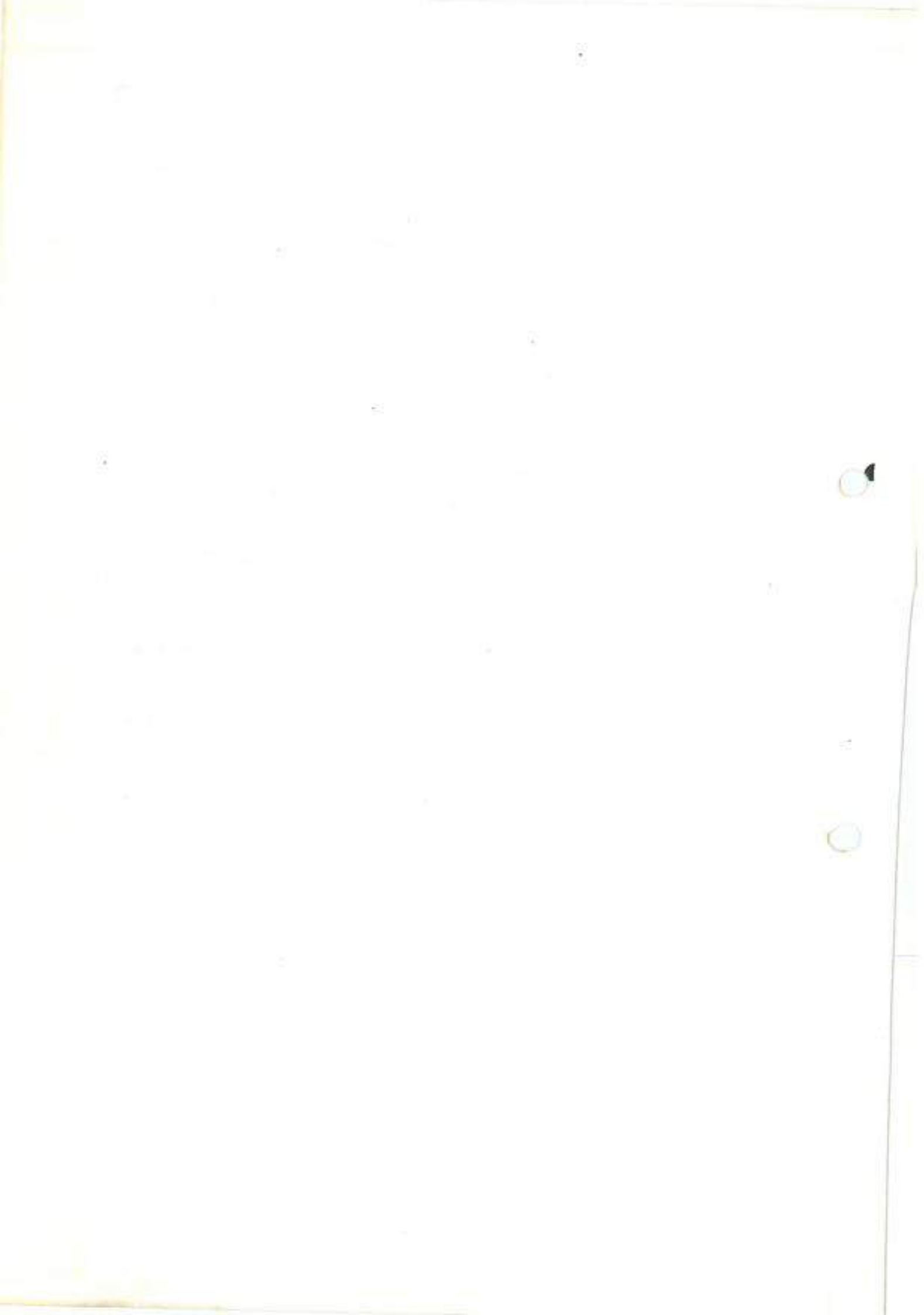
MR B A HYTNER QC  
 MR B F J LANGSTAFF  
 MR G S READ and MISS T GILL  
 (Instructed by Messrs Leigh, Day &  
 Co. Solicitors, London)

For the Defendants:

MR K S ROKISON QC  
 MR M G SPENCER QC  
 and MR C J BUTCHER  
 (Instructed by Messrs Freshfields,  
 Solicitors, London)

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ELEVENTH DAY'S PROCEEDINGSMONDAY, 23rd NOVEMBER, 1992

A  
B  
MR. HYTNER: My Lord, my intention is two-fold. First of all to go through my own written submissions, simply explaining where your Lordship requires explanation or assistance, or defending myself where I am attacked. My Lord, secondly to briefly go through the Defendants' written submissions, indicating where, in our submission, they have misconceived the Plaintiffs' cases, and in those few cases where they do not appear to have done so, simply to give answers.

C  
My Lord, those two exercises will, on the whole, be mixed because I propose to deal with their submissions, as I deal with my own, in some respects.

D  
Can I just say this as a general proposition, that the Defendants' submissions appear to be two-fold. First of all, they appear to be putting up Aunt Sallies, to knock them down. They have put up arguments that we are supposed to have advanced but which in our submission we never have, for the purpose of knocking them down, which isn't very difficult because they would not have been very good arguments if we had.

E  
Secondly, my Lord, they have to some extent in their submissions confirmed the general proposition advanced on behalf of the Plaintiffs, that they never see their mistakes, they never apologise, they self-justify. My Lord, it is an exercise, in our submission, in self-justification where some humility might have been more properly in place.

F  
Can I deal first of all with occupational dose, which I can deal with briefly, but it is slightly worrying? Your Lordship sees from our own very brief submissions that doses having been agreed, really nothing more need to be said. However, phrases used by Dr. Strong seem to us to indicate a certain wriggling off a hook, and our comment, therefore, in the written submission emphasising that the doses are best estimates, that they are agreed, and that any uncertainties which exist are random uncertainties, that was wholly justified because in their own written submissions the Defendants have adopted, repeated and expanded on what clearly were strictly irrelevances in Dr. Strong's evidence.

G  
H  
The situation with occupational dose is very simple. The doses are agreed. They are agreed to be subject to some uncertainties and there is not the remotest suggestion - never was - in Dr. Strong's evidence, or anywhere else, that the uncertainties are anything other than random. In other words, they would not affect an epidemiological study. My Lord, we don't know, and we

MR. HYTNER

A can't anticipate, and I shouldn't anticipate - it is  
always bad advocacy to do so - what one's opponent may be  
doing in the future. My Lord, if it is going to be  
suggested at any time in the future that really you  
cannot rely on these agreed figures for an  
epidemiological study because they are subject to  
uncertainties, and in one or two respects emphasised  
again in the written submissions, there being a gross  
overestimate or something of that sort. My Lord, I can  
only say two things: first of all, these are agreed and  
B they are agreed with their uncertainties and that the  
uncertainties are random. Secondly, it has never been  
suggested for one moment, ever since Prof. Gardner  
reported, that his epidemiological study was unsound  
because the doses he had been given by BNFL were subject  
to uncertainties.

C My Lord, they cannot at this stage come along with  
that sort of argument. My Lord, it may be they won't  
and maybe I am crying before I am hurt.

MR. JUSTICE FRENCH: Well, let's wait and see.

D MR. HYTNER: My Lord, I leave it. My Lord, the  
second observation on occupational dose is this, and it  
is so paltry an exercise that I don't propose to waste  
much time on it. There is a great deal of  
self-justification in the Defendants' submissions  
relating to how right they have been all the time. Our  
experts have given in and their experts have been proved  
right.

My Lord, it is plainly monstrous.

E My Lord, the agreed doses are agreed in many  
respects by each side's experts moving towards the other.  
In some respects the Defendants' experts have withdrawn.

F MR. JUSTICE FRENCH: I don't quite know how it is  
going to be on behalf of the Defendants, having regard to  
the agreement, that what relevance or significance their  
exhaustive submissions on occupational dose are. I  
would perhaps think it a preferable course for you to  
wait and see how it is developed in the end.

MR. HYTNER: My Lord, with respect, I prefer to do  
it that way for the reasons I have given.

G The only other matter which is important because my  
friend indicated during the course of the evidence that  
what I was putting was irrelevant, is their  
misunderstanding of our case in relation to Dr. Howells.  
The Howells factor has not actually been exhausted by  
evidence, as your Lordship knows. I am not going to go  
into it. My Lord, the point we were making on  
Dr. Howells, and it is a point which Dr. Strong accepted  
in his own evidence, in a passage which I have repeated  
H

MR HYTNER

A in the written opening, was simply this: irrespective of whether he was right or whether he was wrong, and for this purpose it doesn't matter, at the time he issued a pretty strong warning which was ignored. My Lord, we have simply used that as indicative of a general attitude. That wouldn't matter even if he had been found later to be wholly wrong. The only passage in the Defendants' submissions to which I draw attention, because it puzzled us, was that they indicated that had the matter been fought out, there would have been evidence that at the time people thought that he was wrong.

B My Lord, when I opened the case I made it clear that we would await the evidence because there was not a single document disclosed on discovery which indicated that anybody had considered Dr. Howells at that time to be wrong.

C My Lord, can I therefore leave occupational dose at the moment and go on to environmental dose?

D My Lord, the first Aunt Sally that the Defendants have put up to knock down, is the suggestion that we have alleged that over the years BNFL have produced false figures. My Lord, if the term "false" is intended to imply mens rea involving intent, we have never made any such allegation and therefore a defence to that allegation is somewhat otiose. We have never suggested that BNFL have intentionally put out false figures or intentionally suppressed correct figures. Our case is, as appears very clearly from the written submission, that for a variety of reasons inaccurate figures have over the years been advanced.

E My Lord, the relevance of the issue is simply this, as your Lordship knows, and it has been expressly made, is that if over the years the Defendants have found it difficult, indeed impossible, to produce accurate figures, whilst at the same time expressing great confidence at all times that they have produced accurate figures, why today should they be accepted when they are equally confident as having produced definitive, final, precise figures for environmental dose?

F MR. JUSTICE FRENCH: Mr. Hytner, that is perhaps looking ahead to an argument which no doubt will be developed at some stage - I may be wrong, but I suspect it will - about the legal burden of proof and the evidential burden of proof. I am not proposing you embark on it now but I see it hanging in the air.

G MR. HYTNER: Your Lordship has anticipated my very next sentence. There clearly is an issue between us on the burden of proof. Can I put it as simply as I can at this stage? Of course, if I had called no evidence and Mr. Rokison had taken the bold, maybe reckless course, of

H

MR. HYTNER

A calling no evidence - since he has called evidence it would be more respectful to him to say that had he not called evidence it would have been reckless rather than bold - my Lord there would have been a very interesting argument as to who would have suffered. As it is I simply put it this way: if in due course it is found by your Lordship that for certain issues or for all issues the burden of proof rests on me, well, I simply then rely on the minimum doses proved by the Defendants and that is rock bottom and that is what can be proved.

B If the burden of proof lies for any issue on Mr. Rokison, then I rely on the argument I am advancing, that they cannot prove a dose and therefore it is very much at large. Not wildly at large. I could not be coming along and suggesting ludicrous figures. All we are suggesting is that their figures are out. It may be C - and again I don't want to anticipate - but it may be that the burden will be different in relation to different issues.

MR. JUSTICE FRENCH: Certainly.

MR. HYTNER: And that may be a more sophisticated analysis.

D There it is, my Lord. If there comes any issue where the burden rests on the Plaintiffs then we simply rely on the minimum figures which have now been proved by the Defendants.

MR. JUSTICE FRENCH: Those minimum figures, are they the figures which Dr. Stather deduced and which are appended to...

E MR. HYTNER: My Lord, I don't want to concede that for reasons which may be advanced during the course of the evidence. Your Lordship is entitled, when you hear F witnesses on one side even if there is no contrary evidence, to draw conclusions which may be in conflict with their final evidence. Just because the Defendants' witnesses are the only witnesses and simply if they are both honest and both men of competence, it does not necessarily follow in a case like this that every precise figure they produce is the figure your Lordship should find if the evidence they give justifies higher figures.

G MR. JUSTICE FRENCH: Yes. Now it may be that you prefer not to answer this question. If you can I would be grateful. What is the finding you ask me to make on environmental dose?

H MR. HYTNER: The finding I ask your Lordship to make at the end of the day is that there were discharges of radioactive material from Sellafield which have caused doses of radiation to be absorbed by the Seascale population by Dorothy Reay and Vivien Hope and their

MR. HYTNER

A families - their parents - which cannot now be accurately calculated, but which before the application of the appropriate RBE were significantly higher than the dose contended for by the Defendants.

MR. JUSTICE FRENCH: Does that complete the answer?

MR. HYTNER: Yes.

B MR. JUSTICE FRENCH: Does it follow from that, from what you said earlier, that if I conclude on this aspect and on this issue the burden is on the Plaintiffs, you would rely as your rock bottom on the figures produced by Dr. Stather and appended to the submission?

C MR. HYTNER: Yes, my Lord. I don't think it would be wrong of me to submit at any stage that I had proved that I could prove doses which were not calculated precisely in Sieverts. In other words, that if the burden rests on me and your Lordship is satisfied that the doses must have been higher than the doses contended for by the Defendants, that would not mean that because I had not produced a figure your Lordship was bound to find on the Defendants' figures. Your Lordship could still find the figures were higher than the Defendants' figures even though I hadn't produced a precise calculation.

D MR. JUSTICE FRENCH: Higher by some unquantified...

E MR. HYTNER: Yes, my Lord. Where I would then be in difficulty would be this, that let us suppose - I am now plucking figures out of the air, but the difficulty with making this sort of submission at this stage in this sort of case is that it is all on a transcript, so I must be careful! This is for illustration only. Let us suppose that the occupational dose argument having collapsed, or your Lordship says you are finding against me, and I am now relying on environmental dose without occupational dose, and I advance the proposition that the environmental doses were high enough to have initiated the leukaemias with some other factor progressing and promoting them, or vice versa. Your Lordship then says to me, "Well, I have heard the geneticists and I am of the view at the moment that for this to happen, for leukaemia or NHL to be caused somatically by radiation, you would require a dose of 50 mSv, and at the moment the Defendants' figures are 20 mSv maximum and you say that the Defendants are wrong", I might then be in a spot of difficulty on that sort of illustration because  
G Mr. Rokison would say, "Well, they have got to prove the 50 and they haven't proved it."

H All I would be doing then is beating the air hopefully and saying to your Lordship, "Well, a significant increase could include 50." Your Lordship might then be looking at me and saying, "Well, it is not good enough."

MR HYTNER

That is the sort of difficulty I envisage I could be in if the burden rests on me.

If, on the other hand, the geneticists, or your Lordship's finding is that on the genetic evidence doses of around 30 to 50 would be sufficient to initiate the leukaemias somatically, and the Defendants have got to 20 and your Lordship looking at the evidence as a whole was satisfied that this was significantly an underestimate, I could well advance the argument to your Lordship that in those circumstances there was no reason why your Lordship should not find on the balance of probabilities that the doses were 30.

MR. JUSTICE FRENCH: Can I endeavour to epitomise what you have just said? I have made a note of your submission and I will call this 2. The absolute minimum of environmental doses are those set out in Stather's Appendix F. The Plaintiffs' submission is that having regard to the arguments advanced in the written submission, the court should find the de facto doses to have been significantly higher. Does that accurately sum it up?

MR. HYTNER: Yes, my Lord.

MR. JUSTICE FRENCH: This is a minor point. I think I have got it right but I just want to confirm it. Where the word "somatic" is used in relation to dose, it is so used by way of contrast to genetics?

MR. HYTNER: Yes. Can I just emphasis this? If the Plaintiffs' major or frontal assault is successful, and that is that the Gardner hypothesis is right - that is shorthand and your Lordship understands it - then whether or not environmental radiation has caused or contributed to the leukaemias is purely academic. It is interesting but it is academic. We win. It is only if we lose on the major issue, on the first issue of occupational dose, that the environmental dose becomes more than academic.

My Lord, in those circumstances it is very important to bear in mind what the problem is we would then face. Our case will be that the leukaemias are caused somatically by background radiation and I don't think that will be disputed.

It is also our case, which will be disputed, that NHL can be caused somatically by background radiation or by radiation.

My Lord, in those circumstances any doses that we could show - environmental doses - would raise the possibility that these leukaemias were caused by the environmental doses. Without wanting to make concessions for which I will be attacked in due course,

MR. HYTNER

A it would appear on the face of it that our real difficulty will not be that; it will be proving on the balance of probabilities that these particular leukaemias were caused by radiation from Sellafield.

MR. JUSTICE FRENCH: You would be driven in that event to discuss questions like relative risk.

B MR. HYTNER: And Seascale. Why Seascale? If it wasn't Sellafield, what has caused the Seascale excess? We come back to Seascale on both occupational and environmental. The fact that I win on the Seascale population does not, of course, mean that Dorothy and Vivien win, but it is a step on the way. My Lord, again without wanting to make specific concessions, if we lose on occupational dose and our Lordship says there must be some other explanation for Seascale than radiation from Sellafield, what I would then be left with is two  
C children who get leukaemia somewhere else and we have then got, on the balance of probabilities, to prove causation between the radiation from Sellafield and the two girls. Obviously then the higher the dose the easier my case would be.

D My Lord, that is how, as I conceive it, it will become relevant.

MR. JUSTICE FRENCH: Mr. Hytner, there is just one other question. The Stather Appendix figures are concerned with dose to red bone marrow?

MR. ROKISON: They are concerned with dose...

E MR. HYTNER: The Appendix to the written submission.

MR. ROKISON: Yes. The ones appended to the written submission, my Lord, are what I might call doses to relevant target tissue. In the case of Dorothy Reay. It may be we are at cross-purposes as to which document your Lordship is talking about?

F MR. HYTNER: During cross-examination Mr. Read asked Dr. Stather to do some more calculations. He has now done them and I think that is what... That is what your Lordship is...?

G MR. JUSTICE FRENCH: I am talking about foetal dose to red bone marrow, infant dose to red bone marrow, pre-conception dose to ovaries, that series of figures.

MR. ROKISON: Yes. They are relevant target tissues for the individuals concerned, my Lord, so that for Dorothy Reay somatically it will be red bone marrow. For Vivien Hope, of course, it will be lymphatic tissue.

H MR. JUSTICE FRENCH: Yes. Whether that is conceded I am not sure yet.

MR. HYTNER

MR. ROKISON: No, but they are the figures that are set out. That is all, my Lord.

MR. HYTNER: I am sorry, I was at cross-purposes, not you.

MR. JUSTICE FRENCH: Now we have got it. We have got foetal dose to red bone marrow, infant dose to red bone marrow in relation to Dorothy Reay.

I may have missed something but I am not conscious of having come across an RBE in relation to red bone marrow. It may be there but I don't remember.

MR. HYTNER: That will be a matter for evidence during the genetic section as to what RBE should be applied to these various tissues.

MR. JUSTICE FRENCH: We have seen RBEs in relation to other tissues.

MR. HYTNER: I suspect the Defendants are adopting just the conventional 20 for alpha and 1 for gamma. My Lord, that is what I assume.

MR. JUSTICE FRENCH: You may be contending for a different, and presumably higher, RBE?

MR. HYTNER: Yes.

MR. JUSTICE FRENCH: Right, I have got that, so we need not at this stage enlarge upon it.

MR. HYTNER: I am sorry, my Lord, I thought your Lordship was referring then to Dr. Stather's re-assessment of dose to the red bone marrow which has been passed to your Lordship and which is the subject of submissions later on in the Plaintiffs' written document but, my Lord, can I come to those in due course?

MR. JUSTICE FRENCH: Come to them in due course. Yes.

MR. HYTNER: My Lord, going back to my written submissions, I have nothing until page 4. That is the position of the NRPB, my Lord, which I can deal with fairly shortly again because it may be that now that the Defendants have seen our written submissions that they will be easier in their minds, but plainly, since we both wrote our submissions blind from each other, one can understand misconceptions arising, though it is a little surprising that they have misunderstood so fundamentally what we were saying. My Lord, it is perfectly simple and can be explained equally simply.

My Lord, as we have said in writing, an analysis of the documents disclosed to us two situations - one, that

MR HYTNER

A there was a pretty close and friendly relationship between NRPB and BNFL and, secondly, that NRPB did not appear to have done much in the way of checking figures given to them by BNFL. My Lord, maybe wrongly, but one is always suspicious in litigation, we thought there was cause and effect there and that somewhat mild suspicion was voiced in one sentence in the opening. My Lord, it was made absolutely clear that we were not suggesting anything improper and it was said in terms nothing improper was being suggested.

B My Lord, when Prof. Jones and Dr. Stather gave evidence - first of all, when Prof. Jones gave evidence - that was explored by me. Firstly, the friendship and closeness was explored and, secondly, the failure to check was also explored. My Lord, that was perfectly justified because, in their own opening statement, the Defendants appeared to be suggesting that their case was that the two men had done assessments wholly independently of each other.

C My Lord, it then appeared, firstly, that we were right in our belief that there was a close and friendly relationship, though Prof. Jones was saying it is professional - we accept that - and we were also right in our belief, on our analysis, that there was no checking of BNFL figures by Dr. Stather. However, my Lord, it became abundantly clear from his evidence, whose honesty we wholly accept, that he was saying, "Of course, we did not check. We never check. It is nothing whatever to do with our relationship with BNFL. Wherever we do these exercises, we accept the plant operators' figures. We have to. We have no means of doing anything other."

D My Lord, it was for that reason that the remainder of our case on the relationship was not put to Dr. Stather because, by that time, it was perfectly obvious that our principal case was right, that there was no checking and, secondly, that there was no cause and effect. My Lord, insofar as we ever suspected there was, that is withdrawn and it is as simple as that, but, my Lord, it was a perfectly valid point to make at the beginning and it is a perfectly valid point to make now that, whilst it is clear that NRPB did not check BNFL's figures, BNFL must have thought that they did because otherwise one cannot fully explain the observation in the opening statement of BNFL that Dr. Stather and Prof. Jones' assessments were independent of each other. They plainly were not. They were inter-dependent because both were using the figures of BNFL, which were not independently checked by NRPB.

H My Lord, that is probably the best point of all, that there were BNFL possibly labouring under the illusion that all was well. Their assessments were being made and, if NRPB came up with similar assessments, everything in the garden was fine because theirs was a wholly independent assessment. We now know that they were not.

MR HYTNER

MR. JUSTICE FRENCH: I see how you put it.

A MR. HYTNER: I am obliged, my Lord. I do not think I need go on any further with that. My Lord, we simply say that we have never made these attacks. The only suspicion we have raised, we withdraw, but it was a cause and effect submission

B My Lord, we then go on - again I am passing over on the supposition your Lordship does not require assistance on any of the remainder as I pass over on the written submissions. My Lord, I deal on page 11 that they have made persistent errors due to complacency, over-confidence and defensiveness.

MR. JUSTICE FRENCH: Sorry, could you pause at ??

C MR. HYTNER: Yes, my Lord.

MR. JUSTICE FRENCH: You are dealing there with plutonium within 20 km from B204 and so forth and that is stated by Prof. Jones to be 190 GBq.

MR. HYTNER: Yes, my Lord.

D MR. JUSTICE FRENCH: And then the amount no longer accounted for by the high stacks would then have to be added to the 66 GBq which Jones does not account for. Then Prof. Jones' figures, the amount to be added, if there were a 20 per cent reduction for radon daughters, would produce a figure for the excess of 104.

E Let us assume for a moment that that chain of argument is valid....

F MR. HYTNER: My Lord, could I just stop your Lordship there for a moment, just to clear up one misapprehension that I was under and which I have now corrected? My Lord, initially I was cross-examining Prof. Jones on an amount within 5 km. Oddly enough, he did not correct me. It was an error on my part which he did not pick up and we went on at crossed purposes on that. He made the very valid point, as I understood overnight that it was valid, that if you are dealing with a 5 km distance you could not do this mathematical calculation, as it were, pound for pound because of the various deposition factors. My Lord, I understood that to be right but, in fact, it was an argument at crossed purposes anyway because what we were dealing with was a 20 km distance and overnight we came back to that and the same figures - I just wondered whether your Lordship picked that up?

G MR. JUSTICE FRENCH: I am afraid I did not.

H MR. HYTNER: I was putting exactly the same figures to Prof. Jones for 20 km that I was putting the day

MR. HYTNER

A before for 5, my Lord, and he readily accepted that. So, my Lord, in the earlier cross-examination we were both making the error and, my Lord, his argument in relation to the mathematics was valid in relation to 5 km but, my Lord, in relation to 20 km, we say that there is no problem at all.

B MR. JUSTICE FRENCH: Yes, but the question I was coming to, let us suppose that the figure for the excess should be 104 GBq. Is any specific or calculated or calculable effect on dose contended for?

MR. HYTNER: No, my Lord, because we accept the evidence, I think it was of Prof. Jones or it may have been Dr. Stather, but anyway, there is no contrary evidence and it would be very wrong for me to contend....

C MR. JUSTICE FRENCH: All right, the answer is no, for which I am grateful.

MR. HYTNER: That you cannot do it. What we say, of course, is the greater the alpha, the greater the dose, but we cannot say that it is, as it were, Sievert for Becquerel. That would be impossible.

D MR. JUSTICE FRENCH: Right, you had got to 11, I think.

MR. HYTNER: My Lord, this is where we set out what our case is. It is not that they have been deliberately putting false figures forward, but they are incompetent through having the wrong attitudes.

E MR. JUSTICE FRENCH: And you emphasise, at the bottom of page 12, the increase from 100 gm to 15-20 kg.

F MR. HYTNER: Yes. My Lord, can I deal very briefly with the rather long meal that has been made of uranium oxide by the Defendants in their written submission. My Lord, there is a great crowing and how right they were and how wrong we were to raise uranium oxide because we started off with Dr. Leslie at 1,000 kg. We have come down and now we accept their figures. I think your Lordship will have seen what has happened. My Lord, first of all, in relation to the 1,000 kg of Dr. Leslie, it is a perfectly fair point for Mr. Rokison to make if he wants to look at evidence that is not actually in evidence. My Lord, all I can say is that, had Dr. Leslie gone into the witness box, I have little doubt that there would have been an entertaining cross-examination. I doubt whether it would have been quite as entertaining as that of Mr. Curtis, who was his opposite number on the Defendants' side, and, in a way, your Lordship has missed that evidence because, in an otherwise dull and tedious case, those two cross-examinations might have been a high spot of entertainment. However, my Lord, your Lordship has been deprived of that and really it is not evidence.

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MR. HYTNER

A My Lord, in relation to Dr. Day and Prof. Jones, again your Lordship has been at the judging game for many years and your Lordship will not have been blind to what appears to have happened. My Lord, the greater the amount of uranium oxide, the higher the gamma dose, but the greater the amount of uranium oxide, the smaller was the amount of the alpha excess.

B My Lord, it is by no means improper in litigation for one party to say, "Well, if the other side are advancing an argument which is more to my advantage than my own, I am going to drop my argument and accept theirs." My Lord, as the genetic evidence was being explored and was maturing all the time, it became apparent that the RBE for alpha might be so great as to make the unaccounted for excess of plutonium far more advantageous to the Plaintiffs' case than the additional uranium oxide.

C My Lord, there has never been an issue over the uranium oxide between the experts in the witness box. If the Defendants wish to crow that we have come down to their figure, that is fair enough. I do not object to that. They are entitled to do that. What they must not do is hint that, because we have done that, it follows that we are conceding that Dr. Day was wrong and Prof. Jones was right. Indeed, they cannot do that because, in evidence, I put to Prof. Jones the one question, suggesting to him that his uranium oxide discharge figure was wrong. So, my Lord, having done that, there has not been an issue as between experts to enable the Defendants to say the Plaintiffs have abandoned Dr. Day. What we have done - and they are entitled to say this - is, "Having contended for more uranium oxide, they have now suddenly collapsed and accepted our figure. Why have they done it?" They can ask that question rhetorically and they will get an answer. We prefer their case and, if that is litigation cynicism, so be it, but, my Lord, it is perfectly valid and legitimate forensic cynicism. My Lord, we prefer their case to the one we advanced in opening and, if the RBE for alpha turns out at the end of the day to be lower than we had hoped, we may have made a mistake, but that is our funeral.

F MR. JUSTICE FRENCH: Yes.

G MR. HYTNER: My Lord, I leave that. My Lord, can I now come to page 14, BNFL's attitude and approach. Can I, first of all, say this, my Lord, that I am castigated in the Defendants' written submissions for having put letters and memoranda to Prof. Jones which he had no knowledge of and it was all very wrong of me to do so. Ironically, I was also castigated, or at least maybe Mr. Read was, for not having put to Dr. Stather a letter written by his employer or his superior to my solicitors in relation to expert evidence.

H

A           My Lord, the Defendants cannot have it both ways.  
The answer is, of course, that there are some cases  
where, if only a subordinate witness is put into the  
witness box, he is the only witness there to have  
documents put to him and, if you do not put the documents  
to him, you may be criticised later if you wish to draw  
inferences from them which he could have dealt with.  
B           There are other cases - and the letter from NRPB to  
Martin Day was one of them - where it is pointless to put  
the letter to a subordinate, even if we had wanted to  
and, my Lord, I say this straight away, even if we had  
pursued the NRPB point, that letter would not have been  
put to Dr. Stather because, in our view, he could not  
have dealt with it. It is a letter from the head of NRPB  
in relation to litigation, but, my Lord, in relation to  
the memoranda and letters within BNFL, Prof. Jones was  
the only witness who was going to be put up and it was a  
perfectly legitimate thing to put those letters to him  
and, indeed, in my submission, it would have been very  
C           wrong if I had not given him an opportunity to comment on  
them.

D           Now, my Lord, in those circumstances, one looks to  
see what the explanations for all these letters were.  
What is said now in the Defendants' written submissions  
is that all past errors were explained by Prof. Jones and  
the present estimates are right. It is a matter for your  
Lordship and your Lordship's recollection of the evidence  
and a reading of the evidence, but for myself, I cannot  
recall that Prof. Jones ever explained why it was that  
the documents which have been disclosed on discovery were  
not discovered by the Defendants themselves for R171 or  
R171 Addendum, why the various estimates of uranium oxide  
had to go up in leaps and bounds, why the argon went up  
E           by 70 per cent. If I have missed something, I will be  
told but, my Lord, I do not recall explanations.

F           My Lord, the other matter which I must emphasise is  
again in relation to uranium oxide. There is a passage  
in the Defendants' submissions indicating that I had  
praised Prof. Jones because he was the honourable  
exception to the attitude of BNFL that Jakeman was wrong,  
that he readily accepted that Jakeman was right. My  
Lord, it is rather curious, that particular passage,  
because again, if that is what they are saying, that Prof.  
Jones was the man at BNFL who was expert enough to know  
whether Jakeman was right or wrong and that he readily  
accepted it; "Therefore," they crow, "We were right yet  
again." My Lord, why was it, in those circumstances, I  
ask rhetorically, because there has been no explanation  
G           from the witness box - why, if Prof. Jones was the man  
who could judge Jakeman, he was not asked for so long to  
do so? Why was it that everybody else was saying,  
"Jakeman is wrong, Jakeman is half mad, Jakeman is this,  
Jakeman is that. NRPB have checked all this. You need  
not worry," and many, many months later it comes to Prof.  
H           Jones?

MR HYTNER

A My Lord, again if it is correct that he was the man who was qualified to judge, it does show an odd attitude on the part of his superiors that they were prepared to attack Jakeman and tell Jakeman's employers that he was wrong without actually having gone to their own expert.

B My Lord, we have dealt with the 99 per cent certain. My Lord, I do not think that I need trouble your Lordship with the rest of it. My Lord, perhaps I ought to refer to page 18 - that is Popplewell - because that is specifically complained about by Mr. Rokison. My Lord, what we were saying about the letters between Dr. Stather and Prof. Jones in relation to Popplewell was really this, that, as Mr. Rokison said in his intervention during the cross-examination, of course, BNFL, like everybody else, would be sent these documents and asked for comments. That was the practice and I may remind your Lordship that at no stage did we ever suggest that BNFL were favoured by NRPB in being given such an opportunity because it has always been accepted and recognised that that would be a practice by NRPB and that BNFL were simply one of many recipients of such letters.

D My Lord, the comments really we made were that where you are invited to comment, one might not expect so strong a request for something to be excised which was correct and relevant. My Lord, what was being asked to be excised was accurate and it was a very, very strong request for it to be taken out. My Lord, the justification for the cross-examination came in the answer that we eventually got, which was so illuminating that we could not really have expected to get that answer when we started. Having accepted that that which he sought to excise was accurate and relevant, what Prof. Jones said was, "Well, yes, I accept that it was over-sensitivity on my part that caused me to want this out." That is our case, of course, and we emphasise that, if he was that over-sensitive about something that actually, on the face of it, was not embarrassing to BNFL, one can envisage the strength of feeling for something to be excised or swept under the carpet if it really was embarrassing, and this is our case, that they are an organisation, like so many others - I have emphasised in the written submission that they may not be so different from many other large organisations, who are over-secretive. They do not want their errors to be made public. They do not want their errors to see the light of day.

G My Lord, the matter that I spent some time on and I do not know whether your Lordship wants me to expand on it at all - it may be that it is so clear in the writing that it is not necessary - is the rather half-hearted claim, because the words he used were, "I may well have" not "I most certainly would have" - the claim by Prof. Jones that, even if Martin Day had not put in his eighth affidavit and asked for the B204 stack documents, he

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MR. HYTNER

A might have done the same himself. My Lord, what I have done, I hope fairly, is to trace through the dates of when all this happened to show that really that claim by Prof. Jones, which I am sure he now believes sincerely, my Lord, really lacks foundation. He could not possibly. There is no way in which, on the timescales of these matters, Prof. Jones would have called for the B204 documents because there simply was not time before he fed the documents into the computer.

B My Lord, there are some typing errors in that....

MR. JUSTICE FRENCH: At what page is this dealt with?

C MR. HYTNER: My Lord, this is dealt with from page 20 onwards, my Lord, and then, in particular, the bottom of 22 and on to page 24.

My Lord, at the top of page 23, there is a plain typing error, which I did not pick up when I checked, and near the bottom, I think "to" should be "of". "In respect of stack B204" but that is trivial.

My Lord, it goes on to the top of page 25.

D MR. JUSTICE FRENCH: Yes.

MR. HYTNER: My Lord, there is a typing error on page 26. Something is missed out. "Whatever the precise meaning of the statement in the Defendants' opening to the effect that Dr. Stather's environmental monitoring constituted an assessment quite independently and without reference to Prof. Jones" that should be.

E MR. JUSTICE FRENCH: Yes.

F MR. HYTNER: My Lord, can I come to page 28 and page 29? My Lord, this deals with the cross-examination by Mr. Read of Dr. Stather. Your Lordship will recall that during the cross-examination he asked Dr. Stather to update his calculations of dose to the red bone marrow and there was an exchange indicating that Mr. Rokison felt it would be a long and expensive job and who was going to pay and so forth. My Lord, we understand, in fact, that NRPB do not charge for their services in relation to this sort of exercise but, my Lord, be that as it may, Dr. Stather, very helpfully and courteously, and, my Lord, in fact, emphasising Mr. Rokison's submission, which I accept, that he regarded himself as an independent witness, and, my Lord, he said that he could do that. He had done some figures, although they had not been checked.

G  
H Your Lordship has those figures and what Mr. Read has done, for which I am very grateful, is he has not only taken those figures, but he has applied the same increase

MR. HYTNER

A to the lymph nodes, and your Lordship will find the extrapolated documents with the submissions. Unless your Lordship wants me to go through those, my Lord, I will not. I will simply take the summary that is in the written document but, my Lord, what has happened is that, on his re-calculation, which I accept has not been checked - my Lord, if anything turns on complete accuracy, which I doubt, he is coming back and the Defendants will have an opportunity to ask him whether his re-checking has caused any fundamental difference to his figures - but it looks as though, as a result of the new release figures which we now have, the dose to the red bone marrow of somebody in the 1950 cohort through to 20 years would have increased by a factor of over 4, and what Mr. Read has then done is to look at the lymph node dose and calculate that, again on the basis of the same increase.

C My Lord, we do not know - and, my Lord, I am not going to make a false point here - we do not know for certain that the lymph node dose would necessarily increase by precisely the same factor, so those figures are not figures which we could say were proved, but again, if there is any doubt about that, Dr. Stather will be returning and that can be put to him, if the Defendants feel that is an unfair extrapolation.

D However, my Lord, it does show starkly how these doses do increase when the new release figures are discovered and all this, of course, would never have come to light if it had not been for the discovery exercise and the fact that the Plaintiffs' solicitors grew suspicious - I do not mean suspicious in the unpleasant sense but, on an analysis of the documents that they had, grew suspicious that the previous release figures must be wrong.

E MR. JUSTICE FRENCH: I am looking at Table 4.8, contribution of low and high level radiation. Have you got that?

F MR. HYTNER: Yes.

MR. JUSTICE FRENCH: It goes across the page rather than up and down.

MR. HYTNER: Yes.

G MR. JUSTICE FRENCH: I am looking at one that goes like this and you are looking at one....

MR. HYTNER: My Lord, I prefer to do it like this.

MR. JUSTICE FRENCH: Right. We have got the same document?

H MR. HYTNER: Yes.

MR. HYTNER

MR. JUSTICE FRENCH: This is microGrays. Is that right?

MR. HYTNER: Yes, my Lord. My Lord, I have always assumed that I am certainly bottom of the class in this litigation in relation to arithmetic and, my Lord, I accept that position with humility and accuracy. My Lord, 5.1 10-to-the-3, as I understand it, is 5,100  $\mu$ Gy.

MR. JUSTICE FRENCH: I think if I write it out and transpose the decimal pint, but what I am really coming to is that I have developed a cast of mind in which I like to think in milliSieverts, and I am just wondering whether I can have any help in translating microGrays into milliSieverts.

MR. HYTNER: My Lord, that depends, of course, on the RBE. On the low LET there is no problem because it is the same. The RBE is 1, so that will be 5.1 mSv, I think.

MR. JUSTICE FRENCH: That is the top line.

MR. HYTNER: Yes.

MR. JUSTICE FRENCH: What about the high LET?

MR. HYTNER: The high LET, my Lord, on the conventional RBE you would simply multiply that by 20 so you would have 3.2 mSv.

MR. ROKISON: Forgive me, my Lord. I am not quite sure which document you are looking at.

MR. JUSTICE FRENCH: I hope it is headed at the top, "4.8"?

MR. HYTNER: Yes, my Lord, Mr. Rokison has got it. I think in fairness to him, and I would have been just as puzzled, we were looking down the 1950 column and he did not realise that.

MR. JUSTICE FRENCH: So 1950, there it is plain for all to see, 5.1, high LET 1.6 ....

MR. HYTNER: My Lord, I have got that wrong. My Lord, it is 0.32 mSv because it is 10-to-the-1, my Lord, not 10-to-the-3.

MR. JUSTICE FRENCH: May I make this suggestion, to prevent a hold-up while calculations are made, if somebody could give me another copy of Table 4.8 in due course ....

MR. HYTNER: In milliSieverts?

MR. JUSTICE FRENCH: In milliSieverts, whether it be high or low LET.

MR. HYTNER

A MR. HYTNER: Yes, always remembering if we do that, that will be in dispute because we will be taking 20 as the RBE, when we will be contending in due course for more.

B MR. JUSTICE FRENCH: Yes. Perhaps again as a reminder to me when the document is produced, having been shown to Mr. Rokison, there could be a note at the bottom, "The Plaintiffs will be contending for a higher ....

B MR. HYTNER: My Lord, the other way of doing it, if I may make a respectful suggestion, is that we do it in microGrays and then your Lordship knows that is to be multiplied in due course by a factor.

C MR. JUSTICE FRENCH: I would rather the way I suggest.

C MR. HYTNER: Very well, my Lord, it can be done that way.

D MR. JUSTICE FRENCH: Your interim figure is expressed in milliSieverts but with a memento, "this is a challenged approach because the RBE is insufficient".

D MR. HYTNER: That can be done. My Lord, I have nearly finished ....

E MR. JUSTICE FRENCH: I think you dealt with a point that I queried going through. The RBE of 20, you say, which is not accepted by the Plaintiffs but must be left for later in the trial, that is the answer, you are going to contend for a higher ....

F MR. HYTNER: Yes. My Lord, I do not think there is anything else, in fact, on my own submissions. Can I turn to the Defendants' submissions? My Lord, I have already dealt with the occupational dose and I do not need to say anything further about it unless I am called upon to do so after Mr. Rokison has addressed you. I need hardly say that we do not accept paragraph 23, that they have demonstrated a "highly responsible attitude over a protracted period".

G MR. JUSTICE FRENCH: We are now on Mr. Rokison, Environmental, page 23, did you say?

G MR. HYTNER: Yes. All I am saying is that we specifically do not accept the passage at paragraph 23. I am not going to say anything further about that.

H MR. ROKISON: Is your Lordship looking at the Occupational Dose document?

H MR. JUSTICE FRENCH: I am not sure which I am supposed to be looking at.

MR. HYTNER

MR. ROKISON: I think you are supposed to be looking at the Occupational Dose document.

MR. JUSTICE FRENCH: I will go to that. What page?

MR. HYTNER: My Lord, it is page 13. My Lord, I am simply saying that I am not going to deal with it but I am specifically challenging paragraph 23. My Lord, I have said what I wanted to say earlier. Can I then turn to what is left of their submissions on Environmental Dose. My Lord, page 2 at the top is an "Aunt Sally":

"Unless the Court is persuaded that Dr. Stather and Prof. Jones were either dishonest or incompetent ...."

My Lord, we have not suggested either.

My Lord, I have already indicated, page 3, 5 (i), we have not suggested they made false assessments, if "false" is intended to imply intent.

MR. JUSTICE FRENCH: Can I, before we pass on, enquire about the word "synergy"?

MR. HYTNER: Yes, my Lord.

MR. JUSTICE FRENCH: I am just wondering how far it is used in any technical sense and if so what that technical sense is? I can understand there may be two ways of using it, one is you simply add one dose to the other and you get a product and the two act in cumulative synergy, but I just want to make sure that the word is not used to convey the idea of "potentiate", as one drug might potentiate another. In other words, the effect of two drugs together may be very much greater than the sum of the two parts, do you follow?

MR. HYTNER: My Lord, that is what it means.

MR. JUSTICE FRENCH: So in other words it is the second meaning which synergy, in your understanding, is designed to convey?

MR. HYTNER: Yes. My Lord, in due course there will be some interesting evidence on this ....

MR. JUSTICE FRENCH: I will tell you why I ask, because early in your submissions you refer to occupational and environmental dose acting in synergy, a concept at the moment I find it hard to understand.

MR. HYTNER: My Lord, that will be explained. That was not a slip. What as I understand it occurs is this, that before a 2, 3, 4 mutation disease actually produces symptoms, actually arises, a number of mutations take place in the cell, in the same stretch of DNA, in the

MR HYTNER

A same chromosome, which has two stretches of DNA. My Lord, my understanding is this, that where you get a disease like leukaemia or cancer you do not have a mutation on one of the --- at one spot of the stretch of DNA, so you get cancer or leukaemia. That does not happen. What happens is that you have a mutation which may be a point mutation, it may be a translocation or something of that sort, this does not produce any ill effect but it predisposes trouble. If there is another mutation on another stretch of the same DNA - on another part of the stretch of the DNA - which interacts because of the function of each part of the DNA, that predisposes the cell to proliferate if a further mutation takes place which affects the function of the earlier parts that have been mutated.

C MR. JUSTICE FRENCH: So the word "synergy" in that context then is designed to connote two successive alterations to the DNA which produce a predisposing effect?

MR. HYTNER: Yes, so the reason why ....

MR. JUSTICE FRENCH: It is used in that sense, I have got it.

D MR. HYTNER: So, my Lord, you could have radiation doing both, first mutation radiation, second mutation radiation.

MR. JUSTICE FRENCH: Yes. You could, I suppose, have it doing both at the same time?

E MR. HYTNER: No, my Lord, because if one is postulating the radioactive material, the ray or the particle, whichever it is, hitting the cell, it will pass through the cell doing damage on the way. It will only actually hit the one part and carry on, it will not ....

F MR. JUSTICE FRENCH: In my innocence I supposed that rays might be like that and you might get two rays close together ....

MR. HYTNER: No, my Lord, that would be two photons hitting the same cell which is probably unlikely.

MR. JUSTICE FRENCH: All right, thank you.

G MR. HYTNER: My Lord, again at the bottom - I merely pick these points up lest it is thought that I am accepting them - at paragraph 6:

H "Prof. Jones and his team have carried out a massive exercise of reconstruction for the purpose of this litigation. This has involved assimilating all available information as to discharges from the very earliest days ...."

MR HYTNER

That is only because of the intervention of the Plaintiff's solicitors and the eighth affidavit.

A MR. JUSTICE FRENCH: Yes, I understand you make that point.

B MR. HYTNER: My Lord, paragraph 7, in view of what I have submitted to your Lordship we would strongly dispute the suggestion that we made attacks on NRPB which were irresponsible. My Lord, it is far more irresponsible in our submission for BNFL to say that their assessments of dose are entirely independent of those of NRPB. My Lord, that is irresponsibility.

C My Lord, I do not think that I need say anything further. I have already had my say on the whole of this and I simply adopt it when dealing with the Defendants' arguments. My Lord, I have dealt again, on paragraph 12, with the suggestions relating to uranium oxide and I do not need to say anything further about that.

D My Lord, can I now deal with page 12, very briefly? My Lord, it is important to look at the unaccounted for plutonium for two reasons. So long as it is unaccounted for the Defendants are unable to say when it was discharged and under what circumstances and in what conditions it was discharged, and both those factors will relate to the doses both in Seascale and of the parents of the infants. My Lord, it is perfectly right that so far as some of this is concerned, the argon for example - I am sorry, I have gone onto the argon which is the next paragraph - my Lord, in relation to the plutonium which, of course, is there all the time, we do not know, for example, the years when it was discharged, so who was breathing it in, who was ingesting it, nor do we know the wind conditions which may have caused it to be resuspended and when, so that it would be again inhaled or ingested by the population. So, my Lord, it is important and it is not good enough for the Defendants say, "Well, it doesn't really matter. We don't know where it is from, we don't know when it came but it is all there and we know the total amount that is there so it can't make any difference to dose". My Lord, we say it can make a difference to dose and they simply cannot account for it and they cannot therefore relate to any particular time.

G The argon - my Lord, I was about to make the point - would be of no relevance to somatic doses to Dorothy and Vivien. We accept that. That does not follow with relevance to their mothers.

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MR HYTNER

A I have dealt with Dr. Jakeman. Coming down to paragraph 22, "The Authorisation Application", my Lord, another large "Aunt Sally" has been put up to be knocked down. Your Lordship may well remember the very great care which I took when I raised the authorisation application not to sensationalise the apparent conflict between Prof. Jones and the application, and my Lord I said we would welcome an explanation. I indicated that we had already got a partial explanation and we would wait to see whether it was right, and the matter was then explored.

B  
C My Lord, there were two problems which appeared to arise in relation to the authorisation applications and we were treading on eggshells at the time because the last thing we wanted was for an attack to rebound because we felt fairly certain that there it was unlikely that BNFL were misleading the Government. My Lord, the two issues were the figures that were given for historic discharges, which were plainly wrong, and the conflict between Prof. Jones and the authorisation application in relation to current discharges. Those were the two issues. The latter issue was resolved because it became clear, and my Lord we accept the evidence, we did when it was given, that the authorisation application figures were right and Prof. Jones was adopting what he called cautious estimates, which we thought was disingenuous because in fact the estimates he was giving simply increased the unaccounted for plutonium but reduced the uranium oxide. My Lord, we accept therefore that as between the two sets of figures Prof. Jones' are the ones which were not right and the authorisation figures were right.

E Then we turn to the other problem, which was the historic discharge figures. My Lord, there the evidence of Dr. Dickinson was diverting because, as your Lordship recalls, he simply could not see that he should answer frankly a very simple question. My Lord, the "Aunt Sally", in the submission of the Defendants, is that we were alleging, or that it was being suggested, that the Government would be misled. My Lord, the Government would not have been misled because they had the wherewithal to know that the figures were not accurate. They could therefore work out the accurate figures themselves if they wanted, but my Lord what we were saying was that a member of the public would be misled and Dr. Dickinson would not have it.

G There are two points to be made. It may be that your Lordship may think at this stage of the case they are jury points rather than points for your Lordship but I make them briefly. The first is that Dr. Dickinson who is, after all, a fairly high ranking employee of BNFL, exhibited that very over-defensiveness in the witness box, in the face of your Lordship, which we have been complaining about. He must be regarded as a man of

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MR HYTNER

A considerable intelligence and authority and he would not answer a simple question because the answer would have been embarrassing. Then of course we come to the difficulty of why, not just in this document, Dr. Dickinson, again an honest witness, my Lord, we accept an honest witness, he did not think about the public, he simply repeated what was in previous annual reports. My Lord, I accept that but the question arises, why in successive annual reports were these figures put in which would not mislead the Government but would most certainly mislead the public. Was it ....

B MR. JUSTICE FRENCH: This is the back-dating of the SEFs?

C MR. HYTNER: Yes, the back-dating of the SEFs. Why? Was it deliberate because they did not want people to know how colossal the previous discharges had been, or was it carelessness, because it did not really matter what historic discharges were? My Lord, we do not know but one thing we do know is that not sufficient care was taken to put accurate figures in.

D The explanation that has been given again is ingenuous. "Oh, well", says Dr. Dickinson, if we put the accurate figures in it would have been much better for us because it would have indicated starkly how much better our discharges were now than they were before" - absolutely right. Your Lordship remembers that very graphic chart which was put in and accepted as accurate by Prof. Jones. If you looked at a chart on which the accurate historical discharge figures were, and then you drew a line at the bottom as to where the present authorised limits are, you would hardly be able to see that line because it would merge with the bottom of the graph. My Lord, that certainly, if you are looking at it from one aspect, emphasises how much better the Defendants' discharges are now than they used to be, and my Lord that is something which I accepted and emphasised in my own opening. It is very much to the credit of BNFL and they can claim credit for it, that now their discharges are minuscule in comparison to the historic discharges, but my Lord if we are looking at it from the litigation point of view, which is the other way round, if you look at their present discharges and the present authorised limits, what were the original historic discharges? They were absolutely massive, which brings me to the final point which I make in the written submissions, and emphasise again because this will be emphasised throughout the epidemiological exercise and the genetic exercise, when one is seeking in the course of this case to consider what is plausible or implausible in relation to other studies, which is effective and what are the relative risks in relation to one study and the Sellafield study, my Lord what one has to recall in all these is that in the civilised world, in the western, developed world, Sellafield's discharges in those years

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MR ROKISON

A were unique. My Lord, mercifully unique in relation to  
 today but, my Lord, we are looking not at today. Dorothy  
 and Vivien did not get their leukaemias last year or the  
 year before.

B My Lord, it may be a very optimistic view to put  
 forward on behalf of BNFL, that these are one-off cases  
 occurring so long ago, but it must be emphasised that the  
 discharges we are talking about and the doses we are  
 talking about relate to a unique period in the history of  
 a plant in the western, developed world. My Lord, what  
 we say is the relevance of this is that instead of coming  
 along and saying, "Look, we are terribly sorry, we made  
 terrible blunders in the early years and we are very  
 sorry that they were not picked up soon enough, we are  
 sorry they were not picked up for the R171 or for the  
 Addendum, but we have got it right now", the Defendants  
 appear to be saying, "Well, we have never really made any  
 C mistakes, insofar as we always did our best and we are  
 still doing our best, and we are confident now we have  
 got it right". My Lord, could it be emphasised, if that  
 is the line they are peddling, that R171 and R171  
 Addendum related not to some minor, unimportant exercise?  
 My Lord, that exercise was in relation to a suggestion  
 that had been made as a result of a finding of television  
 D producers that there might be a link between the Seascale  
 excess of leukaemias and the Sellafield plant, and one of  
 the Defendants' employees in a letter, whilst attacking  
 Mr. Cutler, seemed at that stage to be accepting that the  
 link was not impossible and could not be discounted.

E My Lord, it cannot be said by the Defendants, "Well,  
 now we have been brought to litigation this is the  
 important time to look at historic doses. It has never  
 been important before. When we were looking at  
 authorisation applications historic discharges did not  
 matter. They matter now for the litigation and we have  
 done the exercise properly". My Lord, they cannot be  
 heard to say that because they should have been doing it  
 properly for R171 and the Addendum, and they were  
 F confident then that they had done it properly because  
 your Lordship will remember the confidence of  
 Dr. Anderson that he was 99.9% certain that they had  
 uncovered all the necessary documents, and yet the  
 necessary documents were only uncovered years later as a  
 result of the intervention of a solicitor. My Lord, this  
 is the point we make: why should you now accept that  
 their doses are accurate?

G My Lord, I think having said that, which is our case  
 from start to finish on environmental doses, unless there  
 is anything else that is all I have to submit.

MR. JUSTICE FRENCH: Thank you. Mr. Hytner.

H MR. ROKISON: Thank you, my Lord. My Lord, I was  
 intending to take our written submission as read. I had

MR ROKISON

A assumed your Lordship had read it and, indeed, my learned friend clearly has and he has dealt with some aspects of it. What I was going to do, subject to your Lordship's wishes, was to make a general submission in relation to the environmental dose as it now appears from the respective submissions of the Plaintiffs and the Defendants, and then to deal with a few specific points in relation to my learned friend's submission.

B MR. JUSTICE FRENCH: Yes. Are you going to deal with occupational doses?

MR. ROKISON: Very briefly, my Lord, and I am going to do it now if I may.

C My Lord, so far as occupational dose is concerned, we thought it might be helpful to your Lordship to set it out perhaps at somewhat greater length than the Plaintiffs have. Of course, we didn't know at what length they were going to deal with it and we attempted to summarise for your Lordship's benefit what, in our submission, the evidence as given by Dr. Strong in relation to the agreement which has been reached, was.

D MR. JUSTICE FRENCH: Can I say this that unless persuaded that it is the incorrect approach, I proposed to look simply at the final paragraph of Dr. Strong in the agreement, and look only to the body of his agreement report for an indication of the nature of the qualifications which are placed upon it, and the reasons why, both the two experts are agreed, that the figures cannot be taken as definitive but can be taken first of all as a proper working tool by the epidemiologists. That is what the parties have agreed. Secondly, that it can be taken as a proper working tool for the purpose of the geneticists because that is what the parties have expressly agreed; that second agreement going beyond the agreement of the two experts who reached the agreement.

E MR. ROKISON: My Lord, I think I should just clarify the position slightly. Firstly, of course those figures are now agreed and they are agreed as being the best estimates. Secondly, as your Lordship has observed, the agreed figures are not definitive but are subject to uncertainties as I hope clarified in Dr. Strong's evidence to your Lordship.

F Now your Lordship said it is accepted that they are to be used as a working tool by the epidemiologists and the geneticists. Of course, the purpose of the agreement was that that issue of occupational dose could be got out of the way so that one could get on to consider in relation to occupational doses the epidemiological and genetic evidence.

G However, there is a point which is raised in the expert epidemiological evidence as to the extent to which H

MR ROKISON

A one can place reliance on one study, which on our case stands alone, and particularly a study which relies upon only a very few cases, and where the hypothesis which is put forward, namely, the relationship between occupational dose of the fathers and the child leukaemias, is a matter which depends upon dose figures which are necessarily only best estimates and not definitive.

B Now that is a point which is raised and it is a point for the epidemiologists rather than for anybody else, and that is a point which is raised in the epidemiological evidence.

C Although it is accepted that those are the best estimates figures which should be taken for the purposes of the epidemiological exercise, the fact that the doses are not definitive but are only best estimates with the uncertainties involved, is a relevant question in relation to the strength of one study as opposed to the case where one has a number of consistent studies.

D MR. JUSTICE FRENCH: I am sorry, my mind is spinning, Mr. Rokison. Either the epidemiologists are going to accept in any individual case and over the run of cases, that the figures are figures which are the best estimates and the only ones which they can use, or they are not. I don't quite see how the fact there may be a tolerance of X% one way and X% the other way is going to assist?

E MR. ROKISON: May I just explain? I don't want to argue the epidemiological case now, but Dr. Strong has given his evidence and he gave his evidence in relation to the agreement that had been made and he was asked some questions about it and your Lordship has his evidence. All I am saying is this, and I don't want in any event to anticipate arguments on the epidemiology...

F MR. JUSTICE FRENCH: No, and I am not inviting you to do so. I just want to understand where we are.

G MR. ROKISON: For example, Prof. Gardner produced relative risks for categories of doses. Now that exercise has been re-worked as your Lordship knows, and we now have relative risks for categories of doses. However, it is the case, it is common ground between the epidemiologists, that you may find if one case moves from one category to another, whether going up or going down, that may make a noticeable difference to the relative risk in relation to that particular category. The point which is being raised is simply this and it is a question of what weight do you place upon a single epidemiological study? Our case will be that one of the points you take into account in considering what weight you place upon an epidemiological study is the extent to which the raw material which is being fed into that study

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MR ROKISON

is absolutely accurate, or may be accurate within bounds. That is all. It is a matter which is a matter for the epidemiological evidence.

What has been agreed is that these are the best estimates but they are subject to uncertainties for the reasons set out. We are not suggesting that there is systematic uncertainty at all and therefore it is a matter to be argued about by the epidemiologists.

MR. JUSTICE FRENCH: I think that does enlighten me and I am grateful, but what about the use to be made of the biologists/geneticists of the figures, the occupational figures?

MR. ROKISON: As far as they are concerned, as far as the doses are concerned, everybody agrees that they are what I might call ballpark figures, and I don't think it will make any difference to the genetics evidence insofar as genetic evidence may be directed towards whether or not it is biologically plausible to suggest this hypothesis, bearing in mind the sort of doses that are received. I think the fact that best estimates have been agreed - they are not miles out - is not going to affect that argument.

MR. JUSTICE FRENCH: So can I express, I hope not too inaccurately in this way, that as far as the epidemiologists are concerned it will be, as it were, a slotting exercise, whether you categorise a particular dose in one category or another, and that may affect the working out of the figures. As far as the biologists and geneticists are concerned, then the tolerances on either side of the agreed figures is not expected to have any impact upon their evidence?

MR. ROKISON: My Lord, I think that is right.

The only other point I wanted to make in relation to occupational dose is this, and it relates to the very last part of Dr. Strong's evidence, and indeed he was asked about it. It relates to the support which the Plaintiffs sought to derive in relation to their frontal attack on environmental dose of criticising the alleged cavalier attitude of British Nuclear Fuels in relation to occupational dose.

My Lord, it is our submission that what has been demonstrated by the exercise which has been carried out and by the agreement which has been reached, is that to a very large degree it is agreed that the doses which were monitored and recorded in relation to those who were working in the site, were extremely accurate. There is no criticism which had been advanced against anybody of suggesting that British Nuclear Fuels did not monitor doses and record doses in accordance with the then state of the art.

MR ROKISON

A The essential dispute which arose in relation to occupational dose, the main dispute, was a dispute relating to the efficiency of different film badges which were used at different periods of time and the extent to which they might have over recorded or under recorded, depending on the spectrum of radiation and on the angle of incidence. Your Lordship has seen the effects of that.

B My Lord, it hasn't been suggested, as I say, there was any shortcoming on the part of British Nuclear Fuels in either monitoring or recording the occupational doses of their workers.

C So far as neutrons are concerned, as I merely emphasise, it is set out in Dr. Strong's evidence and in our summary to your Lordship. As far as neutrons were concerned the position was that neutrons were not monitored on a personal basis. That is not a matter of criticism. Nobody was criticised for that because it was simply in accordance with the then state of the art. Indeed, my learned friends in their submission do actually acknowledge very fairly on page 12 that the failure to monitor neutrons on a personal basis was something which was understandable at the time. It was for good reason.

D However, neutrons were monitored in the workplace insofar as the workplace as a whole is concerned and the exercise therefore that had to be done was taking the neutron doses, as recorded and assessed for the workplace, and applying those doses to the individuals. My Lord, there is no criticism advanced of British Nuclear Fuels or their predecessors, for failing to record personal neutron doses at the time.

E I say that because it has been suggested, and I know my learned friend says they are not suggesting anybody was trying to mislead anybody else, but it has been suggested that British Nuclear Fuels adopted generally a cavalier attitude to the members of the public and to their workforce. It was an assertion which my clients very much resented. My Lord, I simply say that in relation to occupational dose it was wholly unjustified. The fact that the exercise has been possible, as Dr. Strong stated, is only because British Nuclear Fuels kept and maintained detailed records throughout the period of operation.

F My Lord, that is all I want to say about occupational dose.

G My Lord, I move to environmental dose and the first question one has to consider is what is its relevance? There is a deal of common ground between the parties, especially in the light of my learned friend's submissions this morning. It is not suggested that

MR ROKISON

A environmental dose was enough on its own to have caused the leukaemia and the NHL of Dorothy Reay and Vivien Hope respectively. That is clear from my learned friend's written and oral submission.

B It is only relevant to a possible synergism, that is, an inter-reaction with either occupation dose to the fathers, which is my learned friends main case, or some other factor, for example, a virus, which is their fallback case. I think my learned friend described it in his opening.

C Now we agree that insofar as the Plaintiffs may establish that the occupational dose to the fathers was a material contributory cause, then environmental doses are of no relevance. However, in considering whether occupational doses to fathers was a material contributory cause, environmental dose may be relevant. The reason why we say that is because, as your Lordship knows, and this is anticipating the epidemiological case, but I only do it for the purpose of showing relevance, is that as your Lordship knows we say the Gardner hypothesis does not explain the Seascale cluster. It does not explain why the cluster was found in the very limited area of Seascale and not generally around Sellafield.

D Therefore, the Plaintiffs need to rely on what I call the Seascale factor. They need to rely on something extraordinary in Seascale to act in synergism on their case with the paternal occupational dose. We simply say that as far as environmental doses are concerned, the evidence is, and your Lordship's conclusion should be, that the environmental doses to relevant persons were not significant in relation to background radiation, so as to work in synergism with paternal dose or anything else.

E It may be relevant, because we will in due course submit to your Lordship, that if one looks and sees that we have got to find some other Seascale factor. If the Seascale factor one finds is something quite different like virus, then one asks the question: why do you need it to act in synergism then?

F To that extent environmental dose and the fact that, as we submit, the environmental dose was small in relation to natural background and other background environmental dose is, or may be, a relevant factor, and simply point out to your Lordship it is not just a question of Dr. Stather producing his table of relevant doses to relevant tissues to the relevant people concerned in this litigation, but he also relates that to environmental dose. That is part of his evidence. When I say "environmental", background environmental dose from other sources.

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H Now, my Lord, the second point is in relation to dose it is important to consider doses to whom, to what tissues and when.

MR ROKISON

A In the case of Dorothy Reay and Vivien Hope, environmental doses are only relevant to somatic dose, either foetus, childhood, or, in the case of Vivien Hope, young adult life. That means that so far as they are concerned one is only concerned with environmental doses from 1961 onwards - early 1961 in the case of Dorothy Reay, 1965 in the case of Vivien Hope - to the target tissues which, in the case of Dorothy Reay would be the bone marrow, in the case of Vivien Hope the lymphatic tissue.

B So far as Mrs. Reay and Mrs. Hope is concerned there is no epidemiological case advanced for maternal preconception. One is therefore concerned, essentially, with the dose to the foetus in 1961 and 1965 respectively.

C So far as the fathers are concerned, of course one is only concerned with the gonads and therefore, by contrast, one is looking to pre-1961 or pre-1965, as the case may be. I make the point because we spent some time discussing discharges of argon-41 in the 1950s, which, according to the evidence, is a radionuclide which primary has an effect on the bone marrow, and it is irrelevant. Doses to anybody's bone marrow in the 1950s cannot be relevant to this litigation.

D My Lord, I now turn to the state of the case and the evidence. Until my learned friend's written submissions the Plaintiffs really were not putting forward any positive case at all. Never mind about the evidence, they weren't putting forward any positive case at all. We now find in their written submission that in part at least they do put forward some figures. They put forward a positive case in relation to one aspect of environmental dosimetry.

E My Lord, it is only the Defendants who have put forward a positive case as to what the environmental doses to relevant individuals' relevant tissues at relevant times were, and what they were in relation to and by comparison with background doses from other sources, which is, we submit, rather an important consideration.

F MR. JUSTICE FRENCH: It is the piechart syndrome, isn't it?

G MR. ROKISON: Well, it is, but, of course, it... I don't want to argue causation now. I will mention it when I get to the way in which my learned friends put forward their case, but if the position is that your Lordship is satisfied that it reflects part of the causative chain, so to speak, if the environmental doses from Sellafield are very much lower than the environmental doses from background, then we will say, on a balance of probabilities, to the extent to which

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MR ROKISON

environmental dose played a part it is more likely to have been background than Sellafield. So it is very important.

MR. JUSTICE FRENCH: Yes.

MR. ROKISON: Of course the second and associated aspect is that the Plaintiffs have adduced no evidence on environmental dose. It is only the Defendants who have adduced evidence. My Lord, they invite your Lordship to make findings, apparently, in relation to figures in their submission, in relation to figures of increases in high LET to lymph nodes, as to which there was no evidence whatever. They invite your Lordship to draw certain conclusions in relation to unaccounted for plutonium, which was not accepted by Prof. Jones and in some respects was not even put to him. They do so without any evidence.

My Lord, on analysis the Plaintiffs' case, and I adopt their phrase because they use it in relation to Dr. Jakeman, but the Plaintiffs essentially rely on seeking to "rubbish" the Defendants' evidence to seek to persuade the court that one cannot make any accurate assessment, or, alternatively, that the true doses must have been significantly higher than those assessed by the Defendants' experts.

My Lord, we submit that without evidence unless your Lordship were to conclude that Prof. Jones and Dr. Stather were either dishonest or incompetent or both, that such a case simply cannot succeed.

My Lord, I make four points in relation to this. First, an argument that you cannot assess dose in the environment cannot avail the Plaintiffs even if they were to succeed upon it because we say they have to show an environmental dose sufficient to found the synergism which they put forward; the synergism between environmental doses from Sellafield and something else.

As my learned friend conceded this morning, it is for them - a surprising concession - to prove their case and not for us to disprove it.

Secondly, and of course my learned friend was very careful about this this morning, by saying, "Oh, well, of course we are not suggesting that the doses were absolutely massive." However, if the answer is that one can make no accurate assessment of dose, so the doses could have been infinitely large, then those doses would have applied to Mr. Hope, to Mr. Reay, to all other members of the workforce who lived in the environment and could potentially affect the total doses of the fathers to the extent to which the whole Gardner hypothesis, which is based upon paternal doses in certain categories, would be totally thrown into confusion.

MR ROKISON

A Thirdly, my Lord, the fact that the Plaintiffs raise  
no positive case does not get round their problem of  
calling no evidence. In our submission your Lordship  
would need evidence in order to be satisfied of a  
negative case of uncertainty. They invite the court to  
say that there are too many uncertainties and therefore  
you cannot assess dose to the environment. They haven't  
called a witness to say that, who expresses that opinion,  
and it is not enough for counsel simply to assert it.  
B Unless that point is either proved by documents put in  
evidence or accepted by our witnesses, that point must  
fail. Again, unless your Lordship concludes that  
Prof. Jones and Dr. Stather, or both of them, were  
incompetent or dishonest.

C Now, my Lord, that point, which is the essential case  
of the Plaintiffs, was not proved by documents adduced in  
evidence. My learned friend hasn't suggested it was.

D The most he seeks to establish by documents which he  
adduces in evidence is, and I will come on to it, that  
from time to time people at British Nuclear Fuels were  
either over-confident or over-defensive. That may or may  
not be the case. I have got to deal with it. It is  
totally irrelevant and somewhat inconsistent, your  
Lordship may think, but it does not prove that you cannot  
rely on the figures which have now been assessed by Dr.  
Stather and Prof. Jones.

E My Lord, they tried to establish this case by  
cross-examination, as they had to, but, of course - and I  
apologise for making the point to your Lordship because  
it is a point your Lordship is very well aware of, but we  
make it in our statement - it is the answers which are  
the evidence and not the questions and that, not only did  
neither Prof. Jones nor Dr. Stather accept the points of  
uncertainty which were put to them, their evidence was,  
and remains, that they were both confident that they had  
done a comprehensive exercise and, on the basis of  
cautious assumptions - that is, conservative, cautious,  
pessimistic, whatever word one uses - on the basis of  
those assumptions, had arrived at doses which  
F over-estimated the true doses. Both of them stuck to  
their evidence, which was very clear, to that effect.

My Lord, we would submit, and we put it as our short  
point in our written submission, that is an end of it, or  
should be, as far as environmental dose is concerned.

G My Lord, as far as our positive evidence was  
concerned, your Lordship heard evidence from Prof. Jones  
and Dr. Stather and your Lordship had evidence put in to  
the extent to which Dr. Stather had relied upon it from  
Profs. Goddard and Thornton. Each of the main witnesses,  
Prof. Jones and Dr. Stather, has done a very substantial  
exercise of reconstruction, reflected in substantial,  
very detailed reports and explained in their annexes.  
H They have each done an enormous amount of work in order  
to produce their reports for the Court.

MR ROKISON

A We have been criticised for saying in our opening  
that they were independent exercises but, my Lord, they  
were and they were independent in three important senses.  
First, the NRPB is an independent body. I do not want to  
go over again the history of the assertion made about  
NRPB and its connection with BNFL. It is set out in our  
written submission very fully. It is perhaps significant  
that the broad generalisation, which was effectively  
B saying that they were in cahoots, was something which was  
not put. It was replaced in cross-examination by further  
and better particulars in a document, which, apart from  
the first point, which was firmly rejected by Dr.  
Stather, was not even put to Dr. Stather, and effectively  
the assertion that NRPB was in cahoots with British  
Nuclear Fuels has been withdrawn.

C My learned friends say in their written submission  
that it was an understandable mistake on their part  
because they read it from the documents. It was no such  
thing, my Lord. The Plaintiffs may not know anything  
about NRPB, but those advising the Plaintiffs know very,  
very well who NRPB are and what they do and what their  
reputation is, and it was a disgraceful allegation to  
have made, in our submission, but it was made and it has  
now been withdrawn and I say no more about it. However,  
D I do rely on the fact that NRPB is an independent body.  
It is the relevant Government advisory body. It is  
highly responsible and conclusions which they reach,  
which Dr. Stather, who represents NRPB, reaches are  
important and your Lordship should, in my submission, be  
very reluctant to reject the evidence, the assessment  
which has been done by NRPB. He is obviously highly  
technically competent and an honest witness, who was  
seeking to assist the Court.

E MR. HYTNER: My Lord, I hesitate, but it would help  
if my learned friend would actually point to what this  
disgraceful allegation was and where it comes, if your  
Lordship is interested.

F MR. JUSTICE FRENCH: Mr Hytner, elements of  
hyperbole tend to creep in.

MR. HYTNER: So be it, my Lord.

MR. JUSTICE FRENCH: It is surprising how seldom  
they affect judicial thinking.

MR. HYTNER: My Lord, I am obliged.

G MR. ROKISON: My Lord, secondly, the second point  
on independence is that it is the fact, and was, indeed,  
the evidence which was actually stated clearly by Prof.  
Jones, that they did not collaborate together in the  
exercises which they carried out, and that is what I had  
meant by saying that it was an independent exercise.  
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MR ROKISON

MR. JUSTICE FRENCH: Sorry, an independent....?

A MR. ROKISON: The exercises which they carried out were wholly independent of each other. There was no collaboration between them in the preparation of their reports for this case. Indeed, I think Prof. Jones said he did not think he had even spoken to Dr. Stather about his evidence.

B MR. JUSTICE FRENCH: I see. You are talking about preparation of reports. I was rather puzzled as to how it was being contended, and it was not, as it turns out, that independent inquiries were made for other purposes.

MR. ROKISON: I will come on to that.

C MR. JUSTICE FRENCH: I have, I think, completely grasped the point, that NRPB are not geared for that sort of thing.

MR. ROKISON: I will come on to that point.

MR. JUSTICE FRENCH: By all means come on to it.

D MR. ROKISON: Yes, but the fact that they carried out exercises, not in collaboration with each other, although, as I will come on to, of course, NRPB did, to some extent, rely upon and incorporate in their analysis discharge figures supplied by British Nuclear Fuels, but they carried out separate exercises and the monitoring which was carried out was complementary, the one to the other. They did not rely on exactly the same monitoring and we set out the detail of the exercises in summary in our written submission.

E We submit that the strength of it is that, having carried out those independent exercises, they came to conclusions which were not identical, but which were compatible, bearing in mind the cautious assumptions which each had made.

F The third point is that, although - and this is the point your Lordship was anticipating - Dr. Stather, in part, relied on information supplied by British Nuclear Fuels as to their discharges, to a large extent, the exercise he carried out was independent of those discharges because the exercise which he carried out was mainly one which was concerned with tracing the monitoring of the ingestion pathway through milk and the food chain, which is concerned not so much with what was discharged, but what got there and how it would then have got into the human body and which organs it might have affected. To a large extent, his assessment, particularly, he said, in relation to the ingestion pathway, which was the main pathway for environmental dose, as he said, that that was derived from measurements in the food chain. That is a different point from the

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MR ROKISON

validation exercise. Measurements in the food chain as opposed to Prof. Jones, which primarily was concerned with other measurements in the environment.

So far as Prof. Jones was concerned, as he told your Lordship, it is a massive exercise which involved, on his estimate, four man years and he was seeking effectively to do an audit of the operation since it had started some 40 years ago. He took into account an enormous number of factors, which were listed in his report, and effectively what he was doing was fitting together the pieces of a massive jigsaw puzzle and, at the end of the day, he produced a finished picture which the Plaintiffs were, in our submission, quite unable to attack. The only point they raised in which they suggested that Prof. Jones' figures were wrong was really in relation to uranium oxide, and it is important because it was not us that raised and concentrated on the uranium oxide issue. It was the Plaintiffs' experts who raised and concentrated upon the uranium oxide issue and, as your Lordship will recall from my learned friend's opening, they put forward the uranium oxide issue, even at that stage, in considerable detail. Several pages were devoted to uranium oxide and the reason why, they said, was, "You contest our case that the Defendants' estimates are not to be relied upon by reference to uranium oxide." They said, "This is the yardstick. If we can demonstrate that the Defendants are way out on uranium oxide, then the Court can draw the conclusion that they cannot rely on any of the assessments at all." That was the way in which they had put their case in outline in their opening.

My learned friend, of course, has to try to explain away why it was that they abandoned the uranium oxide issue effectively and agreed the figures that were put forward by Prof. Jones and suggested that they did it and it was a decision which they took because they thought, on analysis, it helped their case rather than hindered it and, therefore, that they adopted our figures on that basis.

That is quite extraordinary, bearing in mind that when my learned friend opened the case - and it was not very long ago - they were putting uranium oxide in the forefront as the acid test.

Now, my Lord, it may be that the sort of exercise which Prof. Jones carried out with the four man years would not have been carried out but for this litigation. That may be, but it is no less valid for that reason. It was based on an enormous amount of documentation in relation to discharges and monitoring over a large number of years. Again, whether or not those records would all have been dug out and studied and assessed again had it not been for this litigation is also irrelevant. The purpose of discovery is that documents are produced so

MR ROKISON

A that both sides have an opportunity of drawing what conclusions they wish to seek to draw from the other side's documents.

My learned friends had experts advising them over a long period of time and it is significant that, on their examination of the documents, on analysis, they were able to come up with no positive case, save in relation to uranium oxide, which they then, in the end, abandoned.

B The second point, of course, is that these exercises which were carried out by Prof. Jones and by Dr. Stather were both validated, and they were validated by actual measurements and, in particular, measurements in the human body, both whole body monitoring and autopsy. Those measurements demonstrated that the cautious assumptions which had been made in both exercises had, indeed, over-estimated dose.

C My Lord, insofar as the Plaintiffs advance any case on environment, environmental dose, they seem to be making three points. First, they point to possible incompleteness of records, particularly for the early years. Second, they point to errors made by BNFL or their predecessors in the past. Thirdly, they rely upon what they call the attitude and approach of BNFL.

D My Lord, may I take those briefly one by one? So far as incompleteness of records is concerned, they pursued the discovery exercise, as my learned friend has emphasised, with a deal of enthusiasm and it is not suggested that there are any records which they would have expected to find which are missing. As with occupational dosimetry, it is only the fact that BNFL maintain such comprehensive records that this exercise has been possible.

E There are two possible aspects of incompleteness of records. First, that monitoring in the early years was not as comprehensive as it became in later years. Again, there is no criticism advanced of the Defendants, no suggestion that the monitoring that was carried out was not responsible and in accordance with the then state of the art. The second possible aspect is the possibility that extraordinary discharges went unnoticed or unrecorded.

F As to the first of these, we suggest there are three answers. Firstly, it is clear from the evidence that there was monitoring of most environmental pathways from an early stage, even though monitoring became more thorough and regular as time went on. Secondly, the Plaintiffs have not come up with any positive suggestions as to what radionuclides might have been discharged and unmonitored and when, which could have had a relevant dose effect, and the other side of that coin - point 3 - is that what they have come up with, which is argon,

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MR ROKISON

iodine and polonium, there is no evidence or even assertion that any of these could have had any relevant effect on anyone involved in the litigation.

The Plaintiffs are, I suggest, in a slight dilemma because, if radionuclides with a long life are discharged, they will be found in the environment, as they were, in particular plutonium, but if they are short-lived, if it be the case that they were discharged in the early years, they could have no effect, in particular, on children born in 1961 and 1965 respectively and, unless there is evidence to the effect that gonadal doses could have resulted, would have had no effect on fathers either. The evidence is that iodine affects primarily the thyroid, no relevance to this case whatever. Argon, which I have already mentioned, primarily affects the red bone marrow and, as far as polonium was concerned, there was no evidence at all. Indeed, the point about polonium was not even put to Prof. Jones at all. It was put to Dr. Stather, but not put to Prof. Jones, and it was not put to Dr. Stather what the possible significance of it could be.

My Lord, so far as extraordinary discharge is concerned, there is no reason to believe that all significant incidents were not recorded. There are a number of such incidents, as your Lordship knows, which are referred to specifically and taken into account by Prof. Jones and by Dr. Stather. I remind your Lordship of the significant lists set out in Schedules D1 and D2 of Dr. Stather's report. All those incidents have been taken into account in assessing the overall picture. It was not suggested by my learned friends, who had access to all British Nuclear Fuels' documentation, that there was anything extraordinary that had not been taken into account.

My Lord, I move to the next point, which are criticisms concerning errors in assessments in the past. Your Lordship must bear in mind in relation to environmental dosimetry, as in relation to occupational dosimetry, what the purpose of it is. The purpose of monitoring and recording is for radiological protection purposes. It is not for possible litigation, nor is it for possible inquiries such as that which was carried out under the auspices of Black. One goes back from the period when this plant started operating something like 40 years and it is not surprising that over a period of 40 years there may have been errors, but the thorough exercise which has been done has been an exercise of going back through the whole of the records over that period of time and, as I say, there is no evidence that anything of any significance has not now been picked up. On the contrary, those who gave evidence to your Lordship were confident it had.

My learned friends concentrate on R171, R171 Addendum and, in particular, the contribution of Mr.

MR ROKISON

A Jakeman and how the figures changed ultimately as a  
result of his intervention. My Lord, the position was  
that, as your Lordship heard, the Black Inquiry was set  
up and everything had to be done pretty quickly. As far  
as UO<sub>2</sub> was concerned, what British Nuclear Fuels did, as  
the documents in P1 show, was that they went back and  
they sought and dug out contemporaneous records, and  
those contemporaneous records were classified, bearing in  
mind that one was talking about the period in 1954 and  
1955 and the few years thereafter - they were classified  
documents, which British Nuclear Fuels had to get  
B declassified for the purposes of making them available.

It was then that Mr. Jakeman came upon the scene,  
who had been an employee at the relevant time, and he  
pointed out that the figures that had been assessed in  
Dibben and Howells in 1955 were perhaps inaccurate.

C It was Prof. Jones who was ultimately responsible  
for assessing the points made by Dr. Jakeman and  
agreeing the relevant figures, which were then adopted  
for the purposes of R171 Addendum, and the figures which  
were then agreed, not 12 - 12 had been a figure put  
forward by Chamberlain, I think - the figure that had  
been agreed by Prof. Jones was 15-20, and that is the  
figure which Prof. Jones has maintained ever since and  
D has not been shaken from it.

E Now, my Lord, the fact that I pick on that is  
because it is uranium oxide which was concentrated on at  
the outset by my learned friends, but the fact that some  
- on the evidence, very few - previous assessments came  
to be looked at again and revised does not mean and  
should not, in our submission, lead your Lordship to  
conclude that this massive, comprehensive exercise which  
has now been carried out must be wrong or, indeed, is  
likely to be wrong. As I say, there is no evidence of  
anything which has been assessed wrongly, nor, indeed,  
was it put, except perhaps in relation to the unaccounted  
for plutonium.

F The unaccounted for plutonium, and I do not want to  
review the evidence at length on this, we submit is dealt  
with in a pretty comprehensive fashion by Prof. Jones in  
his cross-examination. There was some confusion between  
the figures, partly I think because the actual numerical  
figures were rather similar between the distribution over  
20 kilometres and that over 5 kilometres, but you will  
recall that annexed to Prof. Jones' fourth report, and  
G the document was put before your Lordship, was a diagram  
in which he had done an integration. That integration,  
which your Lordship I think looked at in relation to  
where Seascale came in relation to the "hat"?

MR. JUSTICE FRENCH: Yes.

H MR. ROKISON: From that it appeared that the major  
part of the plutonium was within a fairly short distance

MR ROKISON

of the plant. Your Lordship will recall that the line went down so that by the time one got to a distance of a few miles one was down almost to a level at the bottom.

MR. JUSTICE FRENCH: Yes, what Mr. Hytner called the brim of the hat.

MR. ROKISON: Yes. By that time, as your Lordship had seen, it had come off the slope and was really at the bottom - a bit more than that - and we can look at it again if necessary.

MR. JUSTICE FRENCH: What I said was off the peak and was flattening out.

MR. ROKISON: Yes, almost flat at that stage. My Lord, it was that exercise which was the integration exercise that had been done by Prof. Jones which arrived at a figure - which showed from his other diagram - 70 GBq, that 70 GBq including the uranium oxide, which on the assessment of 20 would produce a figure of 50 GBq within 5 kilometres. It was the other exercise which was the 70. The 20 kilometre distribution, which gave the figure of 66 GBq which was a figure which did not include the uranium oxide.

My Lord, the position was that whatever may have been the precise amount of unaccounted for plutonium, the plutonium was there. That is why it was unaccounted for, it was plutonium which was actually measured in the environment and was there. The question is how it got there and the evidence was, from Prof. Jones and Dr. Stather, that it made very little difference to dose how it got there. In our submission one need go no further than that. Nobody has suggested, there is no suggestion and no evidence to the effect, that it makes any significant difference to dose, and I will give your Lordship the reference when I go to my learned friend's submissions.

My Lord, the last point before I go to the detailed submissions is the point my learned friends make about the attitude and approach of British Nuclear Fuels. Our first and main point on that is that it is wholly irrelevant. The only possible relevance could be if that alleged attitude and approach was an attitude or approach adopted by Prof. Jones so that for that reason your Lordship should not accept his evidence. Other than that it is quite irrelevant and there are, as I say, rather inconsistent assertions made: we were complacent; we were over-confident; we were defensive; we were over-sensitive. It may be that they do not really know what their case is but what they have done is that out of thousands and thousands and thousands of documents going back over the period of operation, as a result of their trawl through the documents, they come up with those in Pl, and it is our submission, and I will come to them to

MR ROKISON

A the extent to which it is necessary in a moment, it is our overall submission that on analysis the documents that they have picked out are wholly innocuous, but insofar as they show that someone at British Nuclear Fuels, in the past, may have have been complacent or over-confident or defensive or over-sensitive, so what?

B We rely upon the evidence of Prof. Jones and Dr. Stather as to the competence and completeness of the exercises they have now carried out. It was not suggested to Prof. Jones that he was complacent. It was not suggested that he was over-confident. It was not suggested he was defensive. All that was suggested to Prof. Jones is that he was over-sensitive in relation to one particular incident, to which I shall come in a moment.

C We also, as your Lordship knows, rely on Dr. Stather, and whatever may have been the attitude and approach of BNFL it was not suggested, has never been suggested, that any shortcomings there may have been in BNFL's attitude or approach was shared by NRPB.

D It is our submission to your Lordship, in summary, that there is no reason at all why your Lordship should reject the evidence of Prof. Jones and Dr. Stather, and that on the contrary there is every reason why your Lordship should accept their evidence.

E My Lord, may I turn just to make a few points on my learned friend's written submission to the extent to which I have not covered it already? My Lord, I have dealt with occupational dose, I have dealt with the relevance of environmental dose, may I just pick up perhaps two matters on page 2, my Lord? My Lord, just in the first paragraph where they set out their case as to relevance and the synergism argument, your Lordship sees the way they put it:

F "... (or alternatively, either of these acting in synergy with some other factor such as a virus) may well have been a contributory cause ...."

MR. JUSTICE FRENCH: Yes, I have ringed that already.

G MR. ROKISON: The point is an obvious one, they have to show on a balance of probabilities that it was. My learned friend anticipates a point which we have made before, and he anticipated we would make it again, that:

"... a contributory cause of the excess leukaemia/NHLs at Seascale, and in particular the leukaemia of Dorothy Reay and the lymphoma of Vivien Hope."

H Of course, your Lordship will have in mind that neither Vivien Hope nor Dorothy Reay were born in Seascale, and

MR ROKISON

indeed Dorothy Reay, so far as we know, never went to Seascale.

A My Lord, the third paragraph on that page, where my learned friends say:

"... even at the doses calculated by the Defendants [radiation from Sellafield] substantially increased the background dose ... and that on the balance of probabilities such increase materially contributed to the excess leukaemias/NHLs ...."

B  
C Again, I do not know whether your Lordship had ringed that but we would submit that an increase in background dose to the extent to which environmental doses played any part in causation cannot assist my learned friends, unless that increase was such that it was greater than the natural background radiation, because otherwise on a balance of probabilities, to the extent to which environmental doses played a part, on a balance of probabilities it was natural background rather than Sellafield, but that anticipates the arguments on causation and I say no more about it now.

D My Lord, page 3, second paragraph, where it is asserted that if it is our case that the doses absorbed somatically were insufficient to cause leukaemia it is for us to prove what they were and that they were insufficient, again, we say it is for the Plaintiffs to prove that the radiation doses emanating from Sellafield were sufficient and on a balance of probabilities materially contributed to the cause of the leukaemia and NHL of the two respective plaintiffs.

E My Lord, I have dealt with the next paragraph I think and have sought to answer the case that it would not be possible to put a ceiling figure upon the doses, and they say in that respect their case remains constant - the answer is yes, their case may remain constant but they have not got any evidence to support it. Then they deal with the uranium oxide issue and I have already dealt with that. My Lord, page 4, they deal with uncertainties in the calculations and I hope I have anticipated that in my submissions to your Lordship already. They then go on to deal with the position of NRPB, about which I say no more.

F  
G I can move to page 6 where they come to detail concerning uncertainties arising from known discharges. First of all they deal with plutonium and I have made the point, my Lord, that the issue on plutonium is not how much was in the environment but how it got there and when. My Lord, in the third sentence of that paragraph they say:

H "The Defendants cannot identify its source or sources (apart from postulating a variety of

MR ROKISON

possible candidates) hence nor can they identify the dates of discharge, nor any other information relating to its characterisation (for example its concentration or resuspension in air)."

My Lord, it is my recollection that in the course of his opening - I think the reference will be Day 1, page 28C (I do not ask your Lordship to look at it now) - my learned friend made the point which indeed is right that to a large extent discharges can be fingerprinted. It is not just a question of where they come from but it may also go to when they were made.

In Prof. Jones' report he deals with this and indicates that one can get a clue as to when discharges were made by reference to the ratio of plutonium-238 to 239 and 240. You may recall his evidence to that effect, that you may be able to tell that because, of course, the nature of the operations at Sellafield, as we have heard, changed. So it is not quite right for my learned friend to say that you cannot identify the source or sources or the time over which it happened. According to Prof. Jones one can get some clue and this is a matter which he has taken into account in his assessment.

My Lord, the next point where they say:

"The excess is beyond any reasonable doubt significantly greater than 66 GBq (within 20 km) suggested Professor Jones."

My answer to that is there is no evidence to this effect whatever. It is not "suggested" by Prof. Jones. That was his evidence; that was his assessment. It is no good the Plaintiffs deciding to adduce no evidence and then as they do here producing a few pages of figures from which they invite the Court, at the bottom of page 8, to draw the conclusion that:

"The true figure for the excess could possibly be 140-150 GBq ...."

If they wanted to do that then they should adduce evidence to that effect. You cannot do it in your closing speech. They put forward two reasons for this, the first being radon daughters, which they deal with at the bottom of the page. They have got hold of the wrong end of the stick I would respectfully suggest here. It is not a question of radon daughters being discharged from the stacks. The position is that radon naturally occurs - it is not a question of it being discharged - but as radon naturally occurs if you measure total alpha then you will necessarily include within your measurement some measurement of radon daughters which are there in any event, and therefore any stack measurement will over-estimate plutonium because it will take account of naturally occurring radon daughters.

MR. ROKISON

A MR. JUSTICE FRENCH: I was under the impression, and perhaps you can dispel it, that the enormous throughput of air resulting from the necessity to cool the plant had the consequence that the output of argon from the stack was something significantly over and above the argon which would naturally be present in the atmosphere. That may be quite wrong, in which case please dispel it.

B MR. ROKISON: Your Lordship is quite right but argon is not a radon daughter. This is something quite separate from argon. Your Lordship is quite right about argon-41, that is true. Argon-41 was discharged as a consequence of the operations at the plant but here one is talking about radon daughters which are part of the decay process of radon, and the point - they are in a sense there naturally - that was made was that if you are measuring total alpha then since radon daughters are alpha emitters, if you attribute everything that you have measured to plutonium you will be over-estimating your plutonium because some of what you have been measuring will be radon daughters naturally occurring, as I understand it. My Lord, I am very much comforted by the fact that my learned junior says that is right but of course I do not give that evidence.

D My Lord, also it is only concerned with the B204 stack and, if I can just give your Lordship the reference, my learned friends refer here at this passage to Day 7, pages 8E-9E. May I just invite your Lordship, not now but if your Lordship is going to check those references and look at them, perhaps your Lordship would be good enough to carry on in the reading and read on to page 10C? Does your Lordship have that reference, on E page 7 of my learned friend's submission, at the top, where he makes the radon daughter point, he says pages 8E-9E? May I respectfully ask your Lordship to continue to 10C and also if your Lordship would to go to pages 50-51 in the same volume of the re-examination, where the point was made, and this is an important point, by Prof. F Jones, that any change in the B204 stack emissions, which is what one is talking about here, will have a very small effect on dose. In the passage to which I have referred to he said that dose was not sensitive to emissions from the B204 stack, the reason for that being that a large proportion of what came out of the B204 stack would not be deposited near the site but would be deposited a lot further away, unlike the uranium oxide which would be deposited near the site. My Lord, you will find those G references in the places to which I have referred.

Indeed, my Lord, at the passage at page 51 of Day 7, where the point is raised, he says this:

"... in other words, using my first method, the source adjustment method ...."

H

MR ROKISON

- which was the method that he used for the purposes of arriving at the 66 GBq, 20 km, as opposed to the integration method which he had used for the 5 km -

"... would have had very little effect on the value for the additional plutonium emissions. Reducing the stack emission figure by 23 per cent would have the virtually pro rata effect on the inhalation exposure of people in Seascale or at any other position in the county over the period when the stack discharges were highest. That is 1952 to 1960 or 1964. So if I were to do that, I am quite sure that the intakes and doses that would be calculated would be smaller and, in particular, the dose due to plutonium inhalation would be about 23 per cent smaller. It would be virtually pro rata."

So, my Lord, the conclusion which my learned friends invite your Lordship to reach at the bottom of page 7, that if you adjust for radon daughters:

"On Prof. Jones' figures the amount to be added if there were a 20% reduction for radon daughters would produce a figure for the excess, of 104 GBq."

I do not know where that occurs in the evidence or where this is said. As far as we can see it is something which is put in this for the first time. It was not put to Prof. Jones and it certainly was not accepted by him, and is not in any of the evidence but we say that is quite contrary to that passage from the evidence of Prof. Jones which I have just read.

Then, my Lord, they deal with the second adjustment which they say is necessary, on page 8, which is the reconciliation of the authorisation application, the fact that Prof. Jones did take into account SEFs but did so on a cautious basis. My Lord, it is stated in the middle of page 8:

"His evidence was that the differences between his figures and those in the Amended Application were accounted for by his 'inclusion in the alpha releases of discharges from Approved Places' i.e. not plutonium."

His evidence, Day 7, page 6A, was that they were "mostly plutonium", discharges from approved places.

So far as any adjustment which has to be made for the figures to take account of SEFs and the fact that a cautious assumption was taken for the purposes of SEFs, again Day 7, page 6B-E, Prof. Jones did not accept that it would make anything but a small difference to his figures. So the suggestion at the bottom of page 8 that one gets 140-150 GBq is, as I say, not only nowhere to be found in the evidence but is contrary to the evidence of Prof. Jones.

MR. ROKISON

My Lord, it is said, on page 9, that it is:

"... no answer to say that none of this matters because of the results of autopsies on six bodies."

Our position, as your Lordship knows, is that the validation exercise which was carried out was extremely important because it demonstrated, according to Prof. Jones and Dr. Stather, that their assessment had reflected an over-estimate of dose.

Dr. Stather said, at Day 8, page 73B, that in his view measurements were more useful than models and your Lordship will recall his answers to my Lord's questions about the autopsy measurements and the extent to which one could rely upon them. My Lord asked him about the process.

So of this rather sweeping statement, which with respect is typical of some of the statements which have been made on behalf of the Plaintiffs, in paragraph 9, to say:

"No one will ever know the circumstances in which the plutonium excess, which on any view was considerable and may well have been massive, came to be ingested or inhaled by the local population ..."

we say simply this, that doses were calculated, although the amount of plutonium has been considerably increased in Prof. Jones' latest exercise, the result is that it makes very little difference to Dr. Stather's assessment of dose.

MR. JUSTICE FRENCH: Choose your point to break off, Mr. Rokison.

MR. ROKISON: May I just come to the end of this paragraph, my Lord, and that would be very convenient?

MR. JUSTICE FRENCH: Of course, yes, choose your own moment.

MR. ROKISON: They go on to say:

"... which, within 20 km, embraced the homes of Dorothy Reay and Vivien Hope, and of course, not long before her NHL was diagnosed, her workplace."

There is a fair old jumble of thoughts here but my Lord, of course, as we have seen from the integration exercise the plutonium was very much concentrated in the area closest to the site, so although Prof. Jones did an exercise in which he considered the area within 20 km, your Lordship has seen that virtually all of it was within a very small distance of the site, so that to talk about "within 20 km embracing the homes of Dorothy Reay

MR ROKISON

A and Vivien Hope" is really suggesting that the plutonium excess in that area was massive is simply not in accordance with the evidence.

B So far as the workplace is concerned, your Lordship will recall that as far as Vivien Hope was concerned she worked at Sellafield in the 1980s and one is here concerned with the excess, the unaccounted for plutonium which was discharged in the fifties and sixties, so that this rather sweeping sentence at the end is in our submission inaccurate and rather misleading.

My Lord, may I pick it up there after the adjournment, and I am confident I will finish within the hour after the lunch break.

MR. JUSTICE FRENCH: Thank you.

(Luncheon Adjournment)

C MR. ROKISON: I was on page 9 of my learned friend's submission and was going to go on just to say something about Argon-41. My Lord, it may be a good idea to take in what is also said on page 13 about Argon-41 as well. I don't want to re-visit Argon-41.

D My Lord, the position is that as the evidence showed, Argon-41 was effectively monitored from the earlier stages. That was the evidence of Prof. Jones, Day 7, pages 48 to 49. He gave evidence concerning the monitoring arrangements which were in existence from the fifties which were designed to pick up a number of emissions from the plume and in particular Argon-41.

E Now, my Lord, the second thing is, as your Lordship heard, of course Argon-41 has a very short half-life. It is a matter of 1.8 hours and I have already addressed your Lordship on the possible relevance of Argon-41 to this case.

F The evidence of Dr. Stather was that this was a matter which he took into account and, indeed, he continued to press British Nuclear Fuels, and satisfied himself that it had been properly taken into account. That is at Day 9 at page 19, A-B.

G Now, my Lord, my learned friends refer, as your Lordship sees in the margin here, although we have not yet got on to this part of their case, page 85 of bundle P.1, which was the document which contained the various correspondence, letters and so on which were put to our witnesses. At page 85 your Lordship may recall there was a manuscript note from a Dr. Pomfret, whether your Lordship recalls that, which was put to Prof. Jones.

H MR. JUSTICE FRENCH: Yes. I cannot say my recall is total, Mr. Rokison.

MR ROKISON

A MR. ROKISON: My learned friend put to Prof. Jones in relation to this, and it is really summarised here, that this was a figure which was said to be subject to uncertainty, possibly by a factor of 2, and it is later said in paragraph (c) on page 13, that this was an occasion where doubt was expressed by an employee of British Nuclear Fuels in relation to discharge figures and the doubt appeared to have stopped with the recipient of the memorandum. It is one of the criticisms that everything was swept under the carpet.

B My Lord, Prof. Jones in the course of his cross-examination did make the point, and my learned friend accepted this, that there seems to be an inconsistency in this document because he says:

C "I attach a copy of our estimation done, assuming a 10% error in all variables...As you will see, the calculated results vary from 3.5 to 7 times 10-to-the-17 Bq. a year. I suggest we write to Stather saying something to the effect that errors are very difficult to estimate. However, making realistic assumptions it is unlikely there will be an error greater than a factor of 2 in the quoted Argon-41 discharges."

D It was quoted as being 5 times 10-to-the-17, and as Prof. Jones said, that is not a factor of 2. On the contrary it only shows a factor of 40% either way. This was in Day 6 at page 27.

E In relation to the criticism that this didn't go any further, this was one of the problems, and I don't criticise my learned friend for this. As he says, he had to put these documents to Prof. Jones because Prof. Jones was the only witness from BNFL to give evidence. It doesn't necessarily follow that it was necessary to put the document to anybody because it didn't, as we would submit, in any way adversely affect Prof. Jones' evidence. If it had been a matter which had been a criticism of him he would have been able to deal with it and it might have been relevant. Of course, it wasn't a criticism of him and he was not able to deal with it and it was irrelevant. However, because it is said that this is an example of the buck stopping within British Nuclear Fuels, those sitting behind me have followed this up and if your Lordship were able to locate in document S, tab 233 - NRPB R215.

G MR. JUSTICE FRENCH: My bundle S only goes to 230.

MR. ROKISON: There must be another S, my Lord.

MR. JUSTICE FRENCH: Yes, I have got it.

H MR. ROKISON: This is NRPB R215, which is dated January, 1988, bearing in mind the Pomfret memorandum is

MR ROKISON

November, 1987. If your Lordship were to go to page 8 of this document, if your Lordship can pick it up at the first break one finds this:

"Despite this considerable difference between the calculated doses and those estimated to be required to have caused the observed incidence of childhood leukaemia in Seascale it is important to substantiate, as far as is practicable, the calculated intakes of radionuclides and tissue doses. It is not possible, however, to confirm radiation doses received by the population from intakes of short-lived radionuclides or from external exposure from Argon-41, the latter being the main source of exposure from the plant discharges up to the time the Windscale piles were shut in 1957. These doses have to be based on information reported by BNFL on discharges from the plant. Uncertainties in the release of Argon-41 have been estimated to be about plus or minus 50%."

If you see there there is a reference "27", and if your Lordship goes to page 21 of this document you will see that reference 27 is a private communication, 1987, from Dr. Pomfret.

This one we have been able to follow up. It does appear that far from this comment being lost in British Nuclear Fuels, it was a matter that was specifically passed on to NRPB and incorporated in this document.

What it goes on to say is interesting because it says:

"The release of Argon-41 was substantially reduced in 1957 and subsequently the majority of the population exposure arose from intakes of long-lived radionuclides..."

It sets out strontium, caesium, plutonium, americium:

"For these radionuclides the most appropriate method for ascertaining estimates of intakes is the measurement of body content; limited support can also be obtained from environmental measurements."

Again, interesting that post-1957 they say primary exposure from the long-lived radionuclides which can be, and were, measured. So it supports the point I was making this morning, my Lord, that Argon-41 was, in a sense, old history and could not affect the relevant doses in the present case.

My Lord, they go on and deal with iodine and polonium and they say in particular iodine-131 and polonium-210 were released and not routinely monitored. So far as iodine is concerned, as I observed to your

MR. ROKISON

A Lordship, it was Dr. Stather, Day 8 at page 17, who said that primarily affected the thyroid. When R171 Addendum was carried out, there was specifically a search for relevant documents in relation to iodine discharges, the reference being Day 7 at page 39F, which is immediately after the passage to which the Plaintiffs refer.

My Lord, there were some measurements of iodine, according to the evidence, which were carried out in the 1950s.

B Your Lordship may recall that my learned friend in his opening had referred to iodine and actually referred to a paper which had reported that the further away you got from Sellafield within the area studied, the greater the incidence of thyroid cancer. It would appear there was no relationship whatever to proximity to Sellafield; quite the reverse. It was a paper which was referred to in my learned friend's opening but I don't think it is necessary to refer your Lordship to it.

C As far as polonium is concerned, it wasn't even put, as I have said, to Prof. Jones, nor was there any evidence as to when it was said to be released, what effect it would have on what tissue.

D Polonium releases were referred to in R171 Addendum and they were specifically taken into account by Dr. Stather. The polonium releases were referred to in his schedule D2, your Lordship recalls, and they were specifically referred to in relation to polonium releases from the Windscale fire in his Annex H21.

E My Lord, I don't want to burden your Lordship with references. The main point I make is that simply there was no evidence about polonium and no relevant point was put to Prof. Jones.

My Lord, my learned friend finished this section by saying:

F "Consequently there can now be no certainty as to the quantities discharged, nor can there be any certainty as to any further discharges of short half-life radionuclides, as Prof. Jones conceded in answer to a question from the court."

They refer to Day 7 at page 31 at C.

G My Lord, it would be fair for them to have referred to the whole of the answer because the question that was put in relation to short-lived radionuclides at page 31 of Day 7 was this:

"Q. Can one be confident that the list is complete, or might some have gone undetected?

H A. That is a very difficult thing to be certain of,

MR ROKISON

A of course, because one relies on the incident either  
being detected by abnormality in the plant being noted or  
perhaps by an abnormal environmental measurement, so  
there has to be some question about the completeness of  
any such list, but I feel confident that all the major  
ones, certainly all the ones which would have required  
separate treatment as I describe, we know about. There  
may be other small incidents which are not included on  
the list, and the extent to which those might have been  
significant overall in the environmental context comes  
B back to the question of whether the amount of activity in  
the environment is in general agreement with the amount  
you expect based on the discharges you have assumed and  
the modelling, so I suppose that would have to be the  
final defence or assurance that could be provided."

C He is saying that he is confident that the major  
discharges were taken account of and the test, at the end  
of the day, is the validation of the modelling exercise.  
My Lord, in my submission there is no evidence and no  
basis upon which your Lordship should conclude that there  
was any relevant significant short-lived radionuclides  
discharged at any time during the operation of the plant  
which could have had any material effect on the relevant  
D doses to the relevant tissues of the relevant people.  
There simply is no evidence to that effect.

D My Lord, caesium and strontium I don't need to deal  
with, although I simply say over the page that SEFs have  
got nothing whatever to do with caesium and strontium.  
The SEF discharges are irrelevant to the question of the  
pile chimney discharges which is what one is concerned  
with, the caesium and strontium.

E My Lord, "Unknown Discharges", they go on to and  
they simply say:

"The Defendants' case is apparently based upon the  
premise that all discharges of radioisotopes from  
Sellafield have now been uncovered. This premise  
is challenged by the Plaintiffs."

F Now that is, with respect, what might be called a  
pregnant challenge. They challenge the premises that  
all discharges have been uncovered but they go no further  
to suggest what further discharges there were or may have  
been.

G As far as the next paragraph is concerned, the only  
thing the Defendants can rely on and the only thing they  
do rely on to suggest that the present figures are not  
accurate, is what they call the Defendants' track record,  
"their attitude and approach". We do not ask the court,  
as they assert there, to make any assumption as to  
accuracy. We invite the court to accept the evidence of  
Prof. Jones and Dr. Stather whose attitude and approach  
has not been criticised and could not be criticised.

H

MR ROKISON

A My Lord, they then summarise their case on complacency, over-confidence and so on which we get on to in a moment.

Page 12, my Lord, the Plaintiffs come back to uranium oxide and I have dealt with that, I hope.

B I have dealt with plutonium. I have dealt with argon-41, which is on page 13 and I come on now to the passage where they deal with BNFL's attitude and approach, which starts on page 14. As your Lordship knows, our overall submission in relation to this is that it is totally irrelevant.

C My Lord, I objected at one stage that material was being put which was purely prejudicial and if I might respectfully say so, your Lordship quite rightly put me down on the basis that something which is prejudicial may nonetheless be permitted to be put in cross-examination because it may lead somewhere. My Lord, the position is that it didn't lead anywhere. It would only have been relevant if it had led to it being put to Prof. Jones that he shared the attitudes which had been demonstrated in these documents, that he was complacent, that he was over-defensive or whatever it might be, but no such conclusion was reached. My Lord, one would be tempted to ignore it because it is, on analysis, really nothing but prejudice, even if the points could be made good. For example, one looks at the first point they make and they are referring to Dr. Anderson at a meeting in July 1985 expressing the feeling that he was 99% certain that BNFL had checked all the data and identified any additional emissions.

E One asks rhetorically: where does that get you? The position was, as I have outlined it and as the evidence has been, that when the Black Inquiry was set up, when NRPB were to report, that a deal of work had to be done in quite a hurry to dig out all relevant records. The discovery exercise in this case, my Lord, was carried on over a very large period of time. Because of the magnitude of it it was agreed it should be rolling discovery. F Although one does not have many documents in court, because as far as the documents in court are concerned they are mainly references by the expert witnesses, it does not mean to say there was not an absolute mass of documentation which was eventually dug out from the records, as one might appreciate.

G Dr. Anderson was wrong. So what? One asks rhetorically: what possible effect can that have on your Lordship's approach to the evidence of Prof. Jones, who has taken a period of something like two years in order to complete his exercise?

H My Lord they then deal with a letter from Mr. Allday to Mr. Russell, which they themselves say it is appreciated it may be a holding response.

MR ROKISON

A        My Lord, they refer to the fact that Mr. Russell could "rest assured all matters relating to the incident were fully considered by NRPB" and that they could not have been aware of the true role of the NRPB.

B        My Lord, if one goes to page 93 to 95, it is that which is concerned with the discharges of burst cartridges and the Jakeman intervention. If one looks at Mr. Allday's letter, what one sees is that they look back to contemporaneous reports, which one would imagine would be the first thing one would do. They have found and identified those contemporaneous reports which are then listed. It is then said by Mr. Allday:

C        "These reports were initially Top Secret Atomic, Secret Atomic and Secret Atomic respectively"

C        Then, far from trying to hide things or sweep things under the table, it goes on:

D        "In order to provide the fullest possible information to the Black Inquiry we took steps to declassify these reports and they were sent to NRPB by Mr. Mummery on the 11th June, 1984. The data in these reports were considered in the NRPB Report submitted to the Black Inquiry..."

D        and they refer to the relevant section of it:

E        "Thus you can rest assured that all matters relating to this incident were fully considered by NRPB..."

E        The position was that one has got to bear in mind at the time this letter was written that what happened as a result of British Nuclear Fuels having the reports declassified, NRPB had been provided with the relevant contemporaneous reports.

F        In my submission there really is no basis for criticism. If I can just go on while your Lordship is looking at it because they are going to deal with it later on, on page 96, it is understandable given the fact they were classified reports that although they had been declassified for the purposes of being produced to NRPB so that they could be taken into account in their report to the Black Inquiry, it is perhaps not surprising that Mr. Anderson expresses the reservation he does in the last sentence of the document at page 96, because he does it in the context of there having been classified documents. He says:

G        "Even though they are now unclassified I would be slightly unhappy (perhaps irrationally) if too much was made of these reports in the public arena."

H        Not on the basis of saying they have got something to hide, but simply on the basis that these were classified

MR ROKISON

A reports and they have had them declassified for this purpose and therefore he feels, and agrees perhaps irrationally, that they ought not to be bandied about too much in the public arena.

There is no criticism, in our submission, which is justified on the basis of that.

B My Lord, the next point they deal with is our attitude to the YTV programme. I don't know whether your Lordship has actually seen that "Windscale: Nuclear Laundry" programme, but I was going to say it was available from all good video shops! My Lord, if at any time your Lordship were interested to see it we could provide your Lordship with a copy. It is part of the background.

C MR. JUSTICE FRENCH: It is really of very general interest.

MR. ROKISON: Well, all one can say is in relation to this point, if your Lordship were to watch the programme your Lordship might quite understand that British Nuclear Fuels were not overjoyed with the presentation in that programme.

D MR. JUSTICE FRENCH: That impression has managed to seep through, even without seeing the programme!

MR. ROKISON: Yes. Your Lordship may know that that programme not only contributed towards the progress of these litigations, but it also spawned another litigation which came before the court...

E MR. JUSTICE FRENCH: About five years ago.

MR. ROKISON: I don't think it is quite as long as that. It was about three years ago before Mr. Justice Gatehouse.

F MR. JUSTICE FRENCH: I thought Mr. Justice MacPherson had one?

G MR. ROKISON: Well this one was before Mr. Justice Gatehouse which was concerned with another aspect of the programme which was plutonium and americium contamination of a house at Ravensglass which gave rise to litigation against British Nuclear Fuels, which was not successful. All one can say is if your Lordship were to see the programme one could well understand that they were not best pleased and it was not really very surprising that they didn't throw up their arms and say, "Thank you very much, Mr. Cutler."

In our submission it is not a relevant matter.

H My Lord, I have dealt with the first remark on page 17 in relation to Dr. Jakeman, which we have looked at on

MR ROKISON

A page 96 of bundle P.1. My Lord, it is simply inaccurate to suggest that the document which one finds at page 98, or the documents at pages 98 to 102 are an attempt to rubbish Dr. Jakeman. It is not an attempt to rubbish Dr. Jakeman at all. Indeed, no doubt they cite what they consider is the most damaging passage from our point of view in their submission. However, my Lord, that is not an attempt to rubbish.

B In any event, what is or may be, and, indeed, perhaps the only point in all this that may be of some relevance to the evidence which was given to your Lordship, is that it was Prof. Jones who appreciated and accepted that Dr. Jakeman had a point and as a result agreed to the figure which is the figure which is still adhered to.

C So far as page 150 is concerned, there was no evidence as to the background to this particular letter. It was a letter from Mr. Curtis, which was concerned with a telephone call which he had had from Mr. Jakeman. Mr. Curtis did not give evidence. Dr. Jakeman did not give evidence. We have no idea what may have been said in the course of that telephone conversation. Mr. Curtis may or may not have been justified in the conclusion that he drew from that, which he reported in this memorandum, but, in our submission, to suggest that it somehow demonstrates corporate defensiveness is manifestly absurd. It was a document which Mr. Curtis saw fit to produce, having had a telephone conversation and gained an impression in the course of that telephone conversation. It goes no further than that.

E My Lord, Popplewell, which is at page 172, is a point in relation to which Prof. Jones was involved and the position was, my Lord, that a draft paper from Dr. Popplewell had been produced and a copy of that had been sent to British Nuclear Fuels to invite their comments and we find that on page 175. They enclosed an outline of material being prepared for publication and they said, "I would welcome any comments on the enclosed draft." The enclosed draft one finds going on from 176 to 178.

F Your Lordship will see, if one looks at page 176, at the end of the second paragraph, they refer to plutonium, and this is plutonium which has been found in autopsy tissues, and the fact that it showed an unusual 238 to 239, 240 ratio, the approximate value found in nuclear weapons fallout, but, of course, one knows that in the earlier years Sellafield, then Windscale, was being used for weapons production. It says:

G "The low values of the ratio suggested that the plutonium was from a source produced by only a short-term reactor irradiation process. Subsequently all three subjects were identified as having been employed at Sellafield Works, an obvious source of low burn-up plutonium."

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MR ROKISON

Just pausing here, yes, but in the early years, and when one sees at the end of that document, page 178, the conclusion that:

"....low burn-up plutonium again seems to be the main source of contamination, suggesting that there may be different processing methods for the low burn-up fuel compared with the high burn-up fuel, and it is the former process which leads to worker contamination, and indeed to intakes by the neighbouring populace."

Reading that, one might be forgiven for reading that as if it were saying now that there is an ongoing risk to the local populace from low burn fuel. That was inaccurate and it was that which Prof. Jones picked up and on page 172 he reaches certain conclusions and, in particular, (ii) on page 172, he says:

"The isotopic data are a clear demonstration that the tissue burdens are not dominated by material currently present in the marine environment near Sellafield. Equally, I believe that it can readily be demonstrated the isotopic composition is clearly different from current discharges from the site, both liquid and aerial."

Then, over on the next page, he says:

"In view of (ii) above I must object to the reference to the Sellafield site as an 'obvious source of low burn-up material'."

And he says that the final sentence seems to be unnecessary speculation.

MR. JUSTICE FRENCH: I have not heard as to whether Calder Hall was low burn-up or high burn-up.

MR. ROKISON: Calder Hall is a power station. That was not weapons production at all, my Lord.

MR. JUSTICE FRENCH: So there was no production of plutonium on the site?

MR. ROKISON: It does not produce plutonium. Sorry, it does not release plutonium.

MR. JUSTICE FRENCH: There was no production of plutonium on the site after 1957.

MR. ROKISON: There were no plutonium releases from the site post 1957, I am told.

MR. JUSTICE FRENCH: There was plutonium production, but none released.

MR. ROKISON: None released.

MR ROKISON

MR. JUSTICE FRENCH: By accident or otherwise.

A MR. ROKISON: My Lord, I am told that there were some releases, but it was high burn-up as opposed to low burn-up, which was the point which Prof. Jones was making.

B MR. JUSTICE FRENCH: I follow. There were releases of high burn-up, but may I inquire, for the sake of absolute clarification, whether the high burn-up releases were in consequence of plutonium manufacture or whether they were in consequence of power production?

C MR. ROKISON: Would your Lordship bear with me? My Lord, I am sorry it is taking a little time. My instructions are that after the piles, the Windscale piles, closed down Calder did produce some plutonium, as well as producing power for civil purposes, but that the low burn-up was in the early years and that that which was produced by Calder was higher burn-up and, as I understand it, became higher as time went on, but the ratio changed.

D My Lord, the plutonium released from Calder Hall was as a result of reprocessing operations, so I am told, but the point was, and it was explained by Prof. Jones in his evidence, that the objection which was being made to this was they are saying, "Here you have something found at autopsy which has ratios which would suggest it is low burn-up?"

E Answer: "Yes, quite right. That will reflect the early discharges from Windscale producing plutonium."

F What this goes on to say, or at least could be read - I would suggest would be read - as suggesting that it is that process of low burn-up compared with high burn-up which is leading to worker contamination and to intakes in the neighbouring populace, this being written in 1987, and the point that is being made by Prof. Jones, which he said was scientifically correct, was saying that this is not right, that it may be that this material was a product of early plutonium emissions and low burn-up, but it is wrong to suggest that the low burn-up emissions are continuing or constitute a present risk.

G My Lord, that is the point he was making and your Lordship can see where this is dealt with if you look at Day 7. From page 20 through to page 22 Prof. Jones deals with it. I do not ask your Lordship to do it now, but it runs on from 20 to 22.

MR. JUSTICE FRENCH: Give me the reference again, please.

H MR. ROKISON: Day 7, page 20G....

MR ROKISON

MR. HYTNER: Could you start at D?

A MR. ROKISON: All right, but it is pages 20-22.  
Day 7, page 20-22.

MR. JUSTICE FRENCH: Mr. Hytner wants me to make  
sure to begin at D?

MR. HYTNER: It is just that I think we had a wrong  
reference in our margin.

B MR. JUSTICE FRENCH: I see. Anyway, page 20-22.  
Are you leaving now page....?

C MR. ROKISON: I was merely going to say in relation  
to that, it was, we suggest, a legitimate point to take  
when being asked to comment and, indeed, it was a point  
that was taken on board with the result that that  
particular sentence was actually removed, and we say  
quite right.

D By contrast, of course, when Prof. Jones queried  
with Dr. Stather, you will recall, his reference to  
Ponsonby Tarn, it was not taken out because Dr. Stather  
considered it was right, and that demonstrates a healthy  
arm's length relationship between British Nuclear Fuels  
and NRPB.

So to suggest there is something sinister or to be  
criticised in relation to the comments made on the draft  
Popplewell paper is, in our submission, totally  
unjustified.

E My Lord, they then go and deal with the annual  
reports and authorisations. We have dealt with that at  
length.

MR. JUSTICE FRENCH: I just want P1 again.

F MR. ROKISON: My Lord, the point is this, and it  
was made in the evidence, that it is clearly the case  
that the figures given for historic discharges are only  
given in a graph form. They are given in a graph form in  
order to illustrate a point which is being made in the  
text. The point being made in the text is that  
discharges have dramatically fallen over the years. If  
one were to have applied SEFs retrospectively, that would  
simply have shown a larger figure for earlier discharges  
and would, therefore, have emphasised the point that was  
being made.

G Perhaps it is, therefore, not surprising that it was  
not done for those purposes, which was not for the  
purposes of reporting to anybody what discharges had  
been, but simply to make the point that they had been  
falling considerably in recent years.

H

MR ROKISON

MR. JUSTICE FRENCH: It would have made the point more dramatically.

A MR. ROKISON: It would have made the point more dramatically, but it was made well enough by simply taking the figures which had been illustrated in the annual reports, and, of course, there is the other point. It is assumed by my learned friends in their criticism in relation to this that it is right, or would have been right, to make an adjustment retrospectively in relation to SEFs. That was something which Prof. Jones would not accept was necessarily the case, to adjust right backwards on the basis of currently assessed sampling efficiency factors.

B MR. JUSTICE FRENCH: I do not really see quite why not.

C MR. ROKISON: I think the answer is it was never gone into. I think the question is it is a difficult technical question as to what efficiency factors you would actually take into account in relation to particular discharges in previous years. It does not follow that you assess it and agree an assessment in relation to certain years, that those figures should necessarily be applied backwards.

D MR. JUSTICE FRENCH: They are not likely to be less necessary the further back you go. If anything, they are likely to be more necessary.

MR. ROKISON: My Lord, the answer is we do not know and it was a point that was not.....

E MR. JUSTICE FRENCH: Of course, we do not know. I was saying likely to be.

F MR. ROKISON: I do not know, my Lord, but it was a point that was not pursued by Prof. Jones. Prof. Jones gave that answer and said that it was a matter of some - I can give your Lordship the reference, or those behind me can. It does not necessarily follow that one should scientifically and it was not really pursued. Your Lordship's point may be right, but at the end of the day the question is what does this show? What does this document and the use of that particular illustration demonstrate? Does that demonstrate a cavalier approach by British Nuclear Fuels, which one should then assume applies to Prof. Jones, or was it something which was simply something that was taken for the purposes of illustration and, had SEFs been applied backwards, the point would have been made even more strongly? We submit the latter.

G MR. ROKISON: My Lord, the reference is on Day 6, at page 61, where this is discussed, my Lord.

H

MR ROKISON

A My Lord, just pausing there, we have looked at all those documents which they rely on and one asks oneself, as a result of a trawl through documents which are going back for a very long time, what does it amount to? In our submission, the answer is not much.

Furthermore, of course, on page 19 they go on to draw the conclusion, because they have to draw a conclusion. What they say, under "The effects of BNFL's wrong attitudes":

B "The effect of their attitudes, either in isolation or combination, was to cause known or suspected but inconvenient data to be swept under the carpet and to inhibit a rigorous effort to ascertain the true facts."

C We say that that is totally unjustified. It is simply not true. It was not proved. It was not put. It was never put to Prof. Jones that this demonstrated an attitude that anything that they did not like was swept under the carpet or that there was something other than a rigorous attempt to ascertain the true facts. If that is what they wanted to put to Prof. Jones and suggest that his report should be taken with a pinch of salt for that reason, it should have been put to him and put very clearly.

D My Lord, what he had said about it - Day 6 at page 47 - you will recall when he was talking about Jakeman, and he said:

E "I found no difficulty in dealing with Dr. Anderson, or with anybody else in BNFL, regarding the possibility that Jakeman might at least be partly right."

F "Dr. Jakeman had sent his report to NRPB, which is what you would expect him to do, and they had looked at it. I am not sure to what extent that was an element. If Jakeman or anybody else continues to press their question, it might be there is some initial resistance, but if an organisation is basically honest it will seek to get to the bottom of it technically, and that is what eventually happened in this particular case."

G That was in relation to that incident. On Day 7, at page 22, where he was being asked about his correspondence with NRPB about low burn-up, he said this at page 22, where it was being put:

H "What I am putting to you is that if you had not been on close and friendly terms with NRPB you might well have got a negative answer to your request?"

MR ROKISON

Answer:

"That is quite possible. I would also add that whatever the amendments to the paper might have been it really detracts in no way whatever from the factual content of the paper, nor do I consider the amendment by NRPB was anything other than sensible and professional. I would never suggest that they try to sweep something under the carpet, despite it being technically correct, simply because it is embarrassing to BNFL, nor would I expect them to acquiesce to that to the point where I would never even ask."

So he is making it perfectly clear, as far as he is concerned, what his approach is, and his approach is a perfectly proper, scientific approach to try to get to the truth.

My Lord, I have already dealt with "Turning the Blind Eye" and the reference to Dr. Pomfret's doubts not being forwarded to NRPB and the research of those behind me demonstrating that, far from them not being passed on, they were.

The point about uranium oxide is, in our submission, totally unjustified. It is said in relation to page 1 of P1 that there is prima facie evidence that someone in authority at BNFL knew prior to the Black Committee and R171 that the estimate of 400 gm was wrong and yet that figure was given to NRPB. That is not what page 1 says at all. What the page 1 document says is that:

"Arthur Chamberlain has made a point to us which you should know about. He says that a Harwell report," which was a report by Booker, "has been referenced in recent unclassified reports which were submitted to" a number of people there set out, "which was set up to consider environmental exposure in West Cumberland some time ago and that the data in this report, of which BNFL were well aware, were inconsistent with the figure of 400 grammes...."

It is not saying somebody knew the estimate was wrong, but simply that they were in possession of data which would, had you analysed it and appreciated that fact, have been inconsistent with 400 gm. That is the explanation of it which was given by Prof. Jones at Day 6, at page 43 A-H.

MR. JUSTICE FRENCH: I am just wondering what the "R.G.A.! Please obtain" - I suppose it must be....

MR. ROKISON: The what, I am sorry, my Lord?

MR. JUSTICE FRENCH: I am looking at the manuscript at the very top of the page. The "X" refers to some recent unclassified report, I suppose. It says, "R.G.A.! Please obtain".

MR ROKISON

A MR. ROKISON: Yes, I see that. I think he is asking him to obtain - if you look at the bottom, there is a cross. That is Booker, and that is the caesium-137 in soil in the Windscale area, and that is the AERE-R4020 which is referred to in the letter. So I think what it seems to be is that there is a request following this letter to obtain that report so it can be looked at.

MR. JUSTICE FRENCH: And there is nothing sinister in the exclamation mark?

B MR. ROKISON: No, I would not have thought so. I am sure if there were my learned friend would have made some point on it. Whether there were or whether they were not, I am sure he would.

C My Lord, I come on to deal with Ponsonby Tarn, which is a point which, as your Lordship knows, was raised by Dr. Stather. It was a point which, as Prof. Jones said in his report, he took it into account. It was something which did not fit in very well with his original data, and one reason why he was more satisfied with the result of the current SEAM modelling exercise was that it was more consistent with the core sampling in Ponsonby Tarn.

D MR. JUSTICE FRENCH: With some of them because the spread was enormous, was it not? Oh, no, it was the two farms.

MR. ROKISON: No, Ponsonby Tarn is the core sampling.

E MR. JUSTICE FRENCH: The point about Ponsonby Tarn was some nuclides might have got there, been washed in rather than being representative of a true area of the tarn itself.

F MR. ROKISON: Your Lordship is absolutely right, yes, and there was a query raised about that as to Ponsonby Tarn because it did not fit in, as Dr. Stather said. It did not fit in with the modelling exercise which was done for the purposes of R171 and 171 Addendum, and that is, as I say, that it is something which is grappled with by Prof. Jones in his report and, as he says, there was this query raised about Ponsonby Tarn and that his present modelling exercise is more consistent with what was found in Ponsonby Tarn.

G My Lord, they go on to deal with the inhibiting of rigorous actions but, in my submission, there is no evidence that there was any such inhibiting, nor again was any of it put. It is quite wrong to say, as my learned friends suggest at the bottom of page 21, that

H "No attempt was made to ascertain the extent of alpha pollution in the area surrounding Sellafield until the Defendants were obliged to do so for the purposes of the current litigation."

MR. ROKISON

MR. HYTNER: "No further attempt".

A MR. ROKISON: "Further attempt". The position was that there were further soil cores which were taken in 1987 and 1988, which were referred to in Annex 10C of Prof. Jones Report. That was at a time between R171 Addendum and the litigation starting. It simply is not the case.

B My Lord, may I just deal with one point raised on page 22, to which we do take some exception, where they say:

C "It is the case for the Plaintiffs that if the current litigation had not been commenced and discovery both vigorously and intelligently pursued by the Plaintiff's solicitors, the true extent of the discharges of radionuclides to the environment and in particular the massive contamination of the countryside around Sellafield by Plutonium prior to 1986 would have been lost in the mists of time."

They go on to say:

D "(The Plaintiffs .... are entitled to make the point that if the solicitors inspecting the documents had had the intimate knowledge that the Defendants have of the nuclear industry, further documents may have appeared significantly resulting in yet further requests and even more significant documents being discovered by BNFL.)"

E That is effectively an assertion which they say they are entitled to make, that discovery has been inadequate. My Lord, in my submission they are not entitled to make that assertion without something to back it up. If it was something that was to found an application for further specific discovery it would have to be backed up by affidavit. My Lord, it is a suggestion that those instructing me have not done their job conscientiously and it is a suggestion which we refute. It is a totally unjustified allegation.

F My Lord, if it had mattered I would call somebody from Messrs. Freshfields to say so.

MR. JUSTICE FRENCH: I do not think it is a point you need dwell on too long, Mr. Rokison.

G MR. ROKISON: Thank you. This talk of the massive contamination from plutonium, your Lordship will have seen the figures, but on Dr. Stather's reworking of the Seascale 1950 cohort, bearing in mind that one is talking about a period of over 20 years, that this arrives at a figure of, I think - if your Lordship would bear with me - your Lordship can see from his reworking over 20 years the figures to bone marrow compared with the figures from

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MR ROKISON

A natural radiation, that the figures in relation to  
Sellafield discharges UO-2 releases and Windscale fire,  
of high LET radiation, are still really quite small  
compared with those from natural radiation. It is true  
that as a result of the reworking of the figures, in  
relation to this particular exercise, the proportion of  
high LET as opposed to low LET has gone up, but the total  
doses over that period have gone up only 17% and as far  
as the comparison with natural radiation is concerned,  
although it is true that high LET radiation from  
B Sellafield discharges has gone up considerably, so has  
that from natural radiation, and that has not been  
challenged.

C So far as the total is concerned, as your Lordship  
sees, the total from Sellafield discharges, including  
UO-2 releases and the Windscale fire, now comes up with a  
figure of something like 7,000  $\mu$ Sv out of a total of  
34,000  $\mu$ Sv. It is not for the first time that these  
epithets such as massive are used and so on, "a massive  
contamination of the countryside by plutonium". We do  
not accept that is a fair description.

D My Lord, there is then a lengthy passage dealing  
with this question about whether, if there had not been a  
further pursuit of the discovery in this case by  
reference to Mr. Martyn Day's eighth affidavit,  
Prof. Jones would have been given access to, would have  
had, the logbooks relating to the B204 stack sampling.  
My Lord, the chronology tells one nothing. The reason  
why it tells one nothing is because the eighth affidavit  
came in September 1991, as your Lordship sees in the  
middle of page 23, which is right, but as Prof. Jones  
said, although, as it says at the top of page 23, the  
initial work on the model started in about spring of  
E 1990, his evidence was, and it is Day 7 at page 1F, that  
it was not until one got to the summer and autumn of 1991  
that the model was developed sufficiently to feed things  
into it. There is the setting up of the model first and  
then you start feeding things into it. So the position  
was that Prof. Jones would have wanted the information at  
about the same time as it was being demanded by the  
F Plaintiffs' solicitors.

G Now, Prof. Jones did not know whether it was a  
request by him which triggered this information being  
given to him or whether it was triggered by the further  
discovery application. It would be quite, quite wrong  
however, whichever may actually have triggered it because  
it came at about the same time, to suggest that his  
evidence, which is set out on page 24, that "he may well  
have still asked for such documents to be located for his  
own purposes must be treated with circumspection" or, at  
page 25:

H "... whilst acknowledging what Prof. Jones may now  
sincerely believe that he would of his own volition

MR ROKISON

have sought and obtained the '8th Affidavit' documents, this claim cannot, in the light of the evidence be sustained."

My Lord, there is nothing that is stated by my learned friends in the chronology there set out, to suggest that answer by Prof. Jones is not to be accepted. There is no doubt that if he were to do a complete exercise he would have wanted those documents. Whether it happened to be triggered by his request or a request for discovery by the Plaintiffs is really neither here nor there.

My Lord, again if this had been a real issue which went to anything of importance in this case I would have called a representative from Messrs. Freshfields in order to give evidence on this point. We chose not to call anybody to do so because in our submission it is totally irrelevant. The position is that those documents were given to Prof. Jones; those documents were taken into account by him; and those documents are reflected in his report and in his evidence to my Lord. What triggered those is neither here nor there but if necessary we would have called evidence in order to demonstrate that the conclusions which my learned friends invite your Lordship to draw from this would be wrong, but it does not matter.

My Lord, my learned friends then deal with the interdependence between the Jones exercise and the Stather exercise. There is really no issue on this. We accept that Dr. Stather's exercise has depended to some extent on information provided by British Nuclear Fuels, in particular relating to discharges, and that is demonstrated by his schedules, D1 and D2.

My Lord, the fact that both of them rely on the same information to validate their models is not, in my submission, something which in any way detracts from either exercise. Of course, they do their exercises, they reach their conclusions and then they look to seek to validate their models and they do validate their models by reference to, in particular, human body measurements.

My Lord, I do not think there is any necessity to deal with anything else on page 27, save to say this, that Dr. Stather's assessment is essentially based on measurements in the food chain and it is not necessarily the case that changes in discharges would change the dose. Certainly it is not necessarily the case that increases in some discharges would necessarily increase dose, because it may be, as your Lordship knows in relation to the plutonium question, that given an amount of plutonium there if you increase the proportion of that plutonium which comes from uranium oxide it has certain consequences on dose; if you increase the proportion that comes from B204 stack emissions it has a different effect on dose. But you cannot have it both ways and as Dr.

A Stather said, on more than one occasion, the effect on dose of where the plutonium came from is very small. That is demonstrated by the fact that the increase in the plutonium discharges from R171 Addendum to the exercise which has been done for the purposes of this litigation does not produce dramatic increases in dose.

B My Lord, they then deal with Dr. Stather's supplementary statement, in which he exhibits in tabular form the doses to red bone marrow for the typical child born in 1950, that is the 1950 cohort. I think the position actually is this, that my learned friends asked him to do an exercise in order to update and compare his R171 figures with the figures which were arrived at by the current modelling exercise. It was then that a question was raised, led by myself, about how long this would take and who was going to pay for it and the position was, as I understand it, that Dr. Stather said he had done one exercise which had been in relation to the 1950 cohort for red bone marrow, and that although that had not been checked he would be pleased to provide those figures, and my learned friend I think confirms that and it was then pursued no further.

D Those are the figures which we now have, and it is true to say, as my learned friends say, that as far as the LET, the high LET doses are concerned, there is the increase to which they refer but one has to bear in mind, as I say, that the total increase in dose over that period is only 17 percent over 20 years, and secondly that the increase in high LET dose from Sellafield is not, I confess, exactly matched but is certainly reflected in a very substantial increase in high LET dose from background radiation, so that it remains the fact that even if you look at high LET alone, that Sellafield discharges contribute considerably less than half, very much less than half, as I pointed out to your Lordship.

F The next point that they raise, on page 29, where they go on and try to apply a parity of reasoning and arithmetic to lymph nodes, my Lord, I simply say there is absolutely no evidence to justify this at all. This is all totally new, it is totally speculative and it was a matter which they did not pursue with Dr. Stather after I had intervened and there had been an indication of how much work would be involved to do the complete exercise, and it is quite impossible to say, "Well, if one were to do the same exercise in relation to lymph nodes", because there is at least common ground in this case that you cannot equate dose effect to one tissue with dose effects to another necessarily. It all depends on what radionuclides you are talking about. It depends on all number of things: it depends on their biological half-life, where they go to, how long they stay there, what the target tissues are and so on. It is manifestly absurd simply to suggest that you simply apply the same sort of mathematical adjustment to lymph nodes as you would apply to red bone marrow. This is evidence and there isn't any.

MR ROKISON

A My Lord, they then go on to go into detail about when it was that certain measurements began. My Lord, I have dealt with this broadly, that it is stated in Prof. Jones' report, for example in relation to air concentrations which they say was started in 1978, he gives evidence as to air sampling which was carried out since 1973 and he also referred, and I referred your Lordship to the passage in relation to argon-41, to air sampling which was carried out as early as the 1950s. This is dealt with in chapter 10 of his report.

B So far as measurements in milk is concerned, again there were measurements that were carried out before 1958. They are referred to in R171 Addendum and in Prof. Jones' report in chapter 7, pages 1-3. My Lord, about two-thirds of the way down page 30 the Plaintiffs say that one should not rely too heavily upon milk data, illustrated by the COMARE I report:

C "One cannot use the information from milk to show what was happening without reference to the information BNFL supplies for the releases from the plant."

D You will remember Dr. Stather drawing on the paper for my Lord, near the witness box, the way in which he had worked backwards from the measurements in milk, making a worst case assumption, and had made his assessment on the basis of that worst case assumption, and your Lordship will remember that he took the middle of 1954 as being the worst case assumption for the uranium oxide releases and it was put to my learned friend that if that information were wrong then he would have to adjust his figure, and the position was I think I raised some objection at that stage, it being put without any foundation in fact, and as one anticipated that foundation in fact was never laid and it was never suggested to anybody, and there is no suggestion in this document that the information that was provided by British Nuclear Fuels which resulted in the worst estimate taking the middle of 1954 was in any way inaccurate or that an estimate of some earlier date should have been taken.

F MR. JUSTICE FRENCH: I suggested, I think, at that stage that you might in due course make the very comments you are now making.

G MR. ROKISON: Indeed, my Lord, and that is why I have made it but I do not want to overburden it by saying anything more about it.

H My Lord, my learned friend deals, at the bottom of page 30, with the question of the records of the two farms showing a ten fold differential. You will remember that when Dr. Stather dealt with this he also referred to the soil measurements that were taken, and his evidence

MR ROKISON

A was that he did not find it so surprising that if one took measurements around two farms that you would find this sort of variation, but that his assessment was supported by the soil measurements which were also taken, the reference being Day 9, pages 19D-20E.

B My learned friends anticipated that argument, because it had been raised with Dr. Stather in his evidence, on page 31, and they suggest that soil measurements can be open to a variety of interpretations and they rely on Ponsonby Tarn. My Lord, Ponsonby Tarn was a case where there was a question raised, as your Lordship said, as to whether the core sample might be explicable in part through water getting into the tarn and bringing in radionuclides from other sources. My Lord, it was never suggested to Dr. Stather that the exercise which he had done in relation to soil sampling on the two farms, as opposed to milk measurements, was in some way unreliable because it was open to a variety of interpretations.

C My Lord, they then raise the question again at the bottom of the page about the presence of radionuclides with short half-lives, and I have already made all the points I want to make about that.

D Argon-41 they come back to on page 32. Perhaps I can give your Lordship one more reference on that. Day 9 at page 18H, Dr. Stather added to the evidence which is summarised by my learned friends on that page and said that he was satisfied that the argon-41 releases had been accounted for.

E My Lord, my learned friends lastly, before their summary, deal with the question of validations. As I say, we place considerable reliance on the validations. The models we say stand up in their own right and it is of significance that they are mutually compatible but it is the validations which demonstrate that the results of the modelling do not underestimate dose.

F We do rely upon, as is anticipated, measurements in air. Of course, Prof. Jones has already taken, and taken into account, measurements in soil. There were then whole body monitoring measurements and autopsy measurements.

G It is true that if checked against the caesium measurements Prof. Jones' and Dr. Stather's predictions are out to some extent, but taken overall they reflect an overestimate and that, as was explained, is not surprising because they took different cautious assumptions. In particular, Prof. Jones had made the assumption that all seafood consumed was of local origin and the consumption of seafood, as your Lordship knows, is or may be a substantial contributor to the food chain dose.

H

MR ROKISON

A Perhaps the most important, my Lord, at the end of  
the day are the autopsy data. It is simply because it  
does represent a measured quantity that there were six  
members of the Seascale population who, as my learned  
friends emphasises, were members of the population who  
had lived in Seascale for sometime, and therefore  
throughout the relevant period, that the autopsy data  
relates to measured quantities and those measured  
quantities are then grossed up to assess the total body  
intake by well recognised empirical models, and therefore  
B there is not the same degree of uncertainty. Now, it was  
asserted by my learned friends that six is not enough,  
but your Lordship will have noted how very consistent the  
pattern is amongst the autopsy data of those six and  
Dr. Stather was very firm and positive in his evidence  
that he considered that sample of six was a very adequate  
validation of his model.

C We agree with my learned friends when they say at  
page 34 that you cannot compare this with the six in the  
highest dose category for the epidemiological study. It  
is our case that six is a very reasonable sample if one  
is seeking to measure plutonium in the environment, if  
from those six one gets a consistent picture, which one  
does. Of course, it is very different where you are  
seeking to draw conclusions as to cause and effect from  
D six cases, not cases which were discovered as the result  
of a case control study but cases which were discovered  
and were then the subject matter of a case control study,  
but I do not want to anticipate the arguments on  
epidemiology any more than I am tempted to by this  
observation.

E My learned friend summarises his case and at page 35  
he says at the bottom that the Plaintiffs welcome  
Dr. Stather's concession in cross-examination that his  
dose estimates could be an error by a factor of two or  
three. That is an inaccurate summary of what he said.  
He did not say that his dose estimates could be an error  
by a factor of two or three. What he said was that a  
modelling exercise may be inaccurate by a factor of two  
or three but of course his evidence was that because of  
F the validation he was able to do of his exercise that he  
was confident and remained confident that to the extent  
to which there was any error he had overestimated doses.  
He said that in chief and he said it again at the end of  
his evidence, and I would invite your Lordship to look in  
due course at Day 9, page 27E-28B.

G My Lord, my learned friends say, no doubt  
anticipating that we would make this point, at page 36:

"They might of course be out by an even greater  
factor."

- no evidence -

MR. ROKISON

A "However the Plaintiffs do not accept Dr. Stather's later suggestion that his model errs on the side of caution and that the dose predictions are higher than the actual doses."

B Just pausing there, perhaps it is not really important whether the Plaintiffs accept that or not because it is a question as to whether your Lordship does, but it is not a later suggestion. He says so in his report and he said so in chief. He confirmed it in re-examination. It was not a later suggestion at all and to say that such a claim:

"... has a familiar ring about it and flies in the face of the history of the Sellafield plant."

C that is, I suppose, a reference back to previous errors in assessment made by British Nuclear Fuels or their predecessors. The position is that Dr. Stather, who was the author of R171 and R171 Addendum, is a man of great experience. It is not suggested he is incompetent, it was not suggested that he was dishonest, it was not suggested he was doing anything other than trying to assist the Court to come to the right conclusion in relation to environmental dosimetry. He is the representative of the NRPB. In our submission, that evidence which he gave, bearing in mind his evidence as to the assumptions that he had made for the purposes of a modelling exercise, bearing in mind the validation that was done, that assertion by him is amply justified. Indeed, it would be, we say, quite impossible, unless the autopsy data were to be totally inaccurate, for Dr. Stather's assessment to be an under-estimate of doses.

E My Lord, my learned friend's quote from COMARE I, which is core bundle "C", tab 38, they cite from page 23, paragraph 5.5. I would just draw your Lordship's attention to paragraph 5.7 where they say this:

F "Notwithstanding the above complexity, we note that the increased doses during the thirty year period between 1950-1980 are still well below the doses that are estimated to have been received, during this period, by the population from natural background and from nuclear weapons testing fallout combined."

G Now that conclusion is a conclusion which is entirely consistent with the conclusion which Dr. Stather reaches and which is clearly exemplified by his figures.

H It is, in our submission, and is clearly the case that whatever may be the precise environmental doses which related from Sellafield discharges, they have been over the period of the operation of the facility at Sellafield, well below the doses in the environment from other sources and nothing whatever to do with Sellafield.

MR ROKISON

A My Lord, we do invite your Lordship not only to adopt as being the only evidence, and as good evidence which the court should accept, to adopt the figures which are put forward by Dr. Stather as being, as he puts them forward, as the largest figures, based as they are on cautious assumptions and being far greater than those figures which would be suggested by the validation exercises. We invite your Lordship to conclude that the environmental doses from Sellafield were no greater than those which are set out in Dr. Stather's report and which we have appended at the end of our submission, and were at all material times substantially less than the doses arising from radiation from other sources.

B May I just say one word about RBEs? All I wanted to say about RBEs is this: we make a note on our summary of doses, drawing attention to the fact that the doses which are there expressed have been expressed in milli Sieverts and expressing them in milli Sieverts or micro Sieverts, as the case may be, obviously takes into account an RBE. As your Lordship knows, Dr. Stather for alpha has used the conventional RBE of 20. Of course, we know that it is to be asserted by the Plaintiffs that certainly in relation to high LET doses to foetus, that the RBE should be something greater than 20. My Lord, that is something which is reserved for further argument.

D MR. JUSTICE FRENCH: Yes, I think Mr. Hytner made that quite clear.

MR. ROKISON: My Lord, your Lordship had a question for me?

E MR. JUSTICE FRENCH: Yes. I was going to ask you whether for the complete avoidance of doubt it is Table 4.8 that you contend to be that which I should find by way of my environmental radiation from Sellafield?

MR. ROKISON: Forgive me, I didn't catch your Lordship's question?

F MR. JUSTICE FRENCH: Are you asking that I should find that the doses set out in Table 4.8 are the doses which you invite me to find?

MR. ROKISON: No.

G MR. JUSTICE FRENCH: Tell me what it is you do invite me to find?

H MR. ROKISON: My Lord, those which we invite your Lordship to find are those which are set out in the relevant chapter to Dr. Stather's report. Those which are in Table 4.8 are historical figures and are limited to different... Document 4.8 is not really relevant tissue. My Lord, it is chapter 6 of Dr. Stather's report where he sets out...

MR ROKISON

MR. JUSTICE FRENCH: Yes, of course, I am sorry. They are in micro Gray?

A MR. ROKISON: Yes. As set out in chapter 6 of Dr. Stather's report. As your Lordship may recall, Table 6.1... My Lord, it is Table 6.1 on page 70 of his report. That is the radiation dose to the bone marrow of Dorothy Reay from exposures in utero and after birth. Table 6.3 is the radiation dose to the lymphatic system of Vivien Hope from exposure in utero and after birth up to the date of diagnosis. That is page 72 of his report. My Lord, Table 6.8 on page 77 deals with a radiation dose to the ovaries of Elizabeth Reay and the dose to the testes of George Reay from environmental sources. Tables 6.10 and 6.11 on page 78 deal with the radiation doses to ovaries and to testes of Monica Hope and David Hope respectively. Those doses we have summarised for your Lordship as Annex 1 to our written submission, which follow immediately. It is at the end. They are taken from that document.

C MR. JUSTICE FRENCH: If I go to Annex 1, that gives me the answer without going to... I haven't had a chance to compare the...

D MR. ROKISON: No, but it may be your Lordship will want to cross check it and if you do those are the documents from which it comes, those I have just listed. If your Lordship wanted to say anything in general terms about the radiation doses to the red bone marrow for children in Seascale, which is what is recorded in Table 4.8 of the document to which your Lordship had referred me, Dr. Stather's figures for that are in Table 4.1 to his report at page 38.

E MR. JUSTICE FRENCH: Table 4.1 of Stather at page 38, dose to red bone marrow.

MR. ROKISON: For children in Seascale, depending on their date of birth, subject only to this, my Lord, that he is...

F MR. JUSTICE FRENCH: Now for what purpose am I looking at this?

G MR. ROKISON: Your Lordship probably isn't. Your Lordship asked me about Table 4.8 and I was merely saying if you wanted to know what Dr. Stather's current figures were, that compares with Table 4.8 which is dealing with the various cohorts...

MR. JUSTICE FRENCH: Mr. Rokison, I don't want to know anything I don't need to know.

H MR. ROKISON: Very well. My Lord, I say no more. My Lord, unless I can assist your Lordship further, those are my submissions.

MR HYTNER

A MR. HYTNER: I have a number of very short points, my Lord, and I shall go through them seriatim. My Lord, I hope I am not insulting your Lordship with my first point, but since it has been pressed over and over again to the contrary I think I would be in some trouble with those in front of me if I didn't make some reference to it.

B My Lord, the fact that we did not call evidence does not mean that your Lordship is duty bound to find that the two witnesses called for the Defendants gave wholly accurate evidence which is to be accepted in all circumstances.

MR. JUSTICE FRENCH: That is a proposition I have no difficulty in understanding, Mr. Hytner.

C MR. HYTNER: I thought not, my Lord, but I thought I really had to make it. The contrary view seems to have been pressed on your Lordship over and over again.

D Can I deal very briefly with Jakeman? The point we make about Jakeman and Prof. Jones, which hasn't been answered, is if they were not trying to rubbish Dr. Jakeman why was it left from October 1984 until apparently January 1986, before the man who was qualified to deal with Jakeman was asked to deal with it?

E It is a question your Lordship had put, because it may be that your Lordship was surprised by his evidence. It is Day 6, page 44A, radon daughters and the suggestion that we had no right to produce calculations in a final speech which weren't in evidence. Well, of course we can do anything we want, provided it arises out of the evidence, and the calculations are correct. My Lord, the situation with radon daughters and the authorisation is this, that Prof. Jones conceded he had not taken into account radon daughters, and he should have done. Apart from the somewhat pedantic attack in my use of the word "discharge" - my Lord, I am not sure it is wholly wrong because radon naturally occurring in the air would be discharged through the filters with the plutonium, so in fact it is not wholly wrong. However, the position is that Prof. Jones knowing that part of the alpha on the filters came from radon, didn't take it into account. He later conceded he should have done and he gave a figure of about 20%.

F  
G My Lord, all we have done is accept his evidence and to calculated therefrom. My Lord, it is not an accurate calculation because his 20% isn't accurate; it is an estimate. All we say is that the 66 GBq falls to be increased, possibly up to 104 GBq because of the radon daughters.

H Similarly, my Lord, when asked about the conflict between his figures and the authorisation figures, it emerged that the difference was that whereas the

MR HYTNER

A authorisation figures were regarded by BNFL as accurate, and we accept that, his figures contained what he called "cautious" assumptions and there fell to be another 20% to 25% to be removed from the B204 releases and which again, we say, must be added, either wholly or in part, to the excess plutonium. My Lord, it is as simple as that. We don't pretend we can be accurate in any event, so many of these figures are estimates in themselves.

B My Lord, the next point: Mr. Read and I are slightly worried because we think we may have misheard Mr. Rokison so I trust there won't be a howl that we are making a bad point if we have misheard. We thought we heard Mr. Rokison say, but we weren't paying sufficient attention to be sure we were accurate, that the SEFs were not applied to the caesium. My Lord, if he did say that, it is wrong, because Prof. Jones in his report indicates that he thought an SEF of 4 should be applied to caesium. Your Lordship will no doubt have a note of that. If we are wrong we apologise to Mr. Rokison.

C My Lord, authorisation application. All our worries about the authorisation application were dissipated, partly by Freshfields' letter and then by Dr. Dickenson, who, if one assumes him to be honest, which we do, simply didn't think about it. It was a wholly thoughtless exercise. He put in the application the figures from the Annual Reports, and as he rightly said, if he had thought about he might have put the true figures in because they would illustrate his point more starkly - absolutely right. It then emerged that the Annual Reports from 1986 onwards were not applying the SEFs historically.

D Now, my Lord, either that was done with intent, which is probably untrue, and, my Lord, we don't make the point, or it was utter carelessness, because on any view however Mr. Rokison is now putting that you are not sure whether you apply SEFs historically or how far you apply them historically, there is no doubt that the impression was being given in successive Annual Reports that the historical discharge figures were accurate. We certainly know that some of them weren't accurate.

E My Lord, all we were saying is they were careless about the impression given to the general reader, the general public, as to the level of their discharges. No member of the public would have had a clue that there was a questionmark over the extent of the discharges prior to 1986. We know that there was a very considerable questionmark.

G My Lord, the next point is argon-41. My Lord, again it may be that we misheard Mr. Rokison or it was a slip of the tongue on his part. Argon-41 is a gamma emitter and so it doesn't mainly affect the red bone marrow.

MR HYTNER

A My Lord, the next point is upsetting for us, at least it certainly would be if it were left. This is another Aunt Sally. There is no reflection at all on the integrity of the Defendants' solicitor in the comment about discovery and my instructing solicitors would be deeply distressed if it were thought that that was so because there is in fact a very good relationship between the solicitors. In view of what has been said already I had better not say there is a close and friendly relationship in case that is misunderstood! However, B my Lord, there is a very good and sound relationship and there is not the remotest suggestion that there is a lack of integrity on discovery.

C My Lord, the point being made is a wholly legitimate one. It is not for Freshfields - it is not their job to go through the documents and wonder what the relevance may be of other documents. They rely on their clients to give discovery and there is no suggestion of any lack of integrity on the part of BNFL. There were masses of documents in this case. What we are saying is very simple: that neither Freshfields nor BNFL, acting with total integrity, spotted the point that Martin Day had spotted. D If he hadn't, unless Prof. Jones' claim is warranted, there is every possibility that the B204 stack release documents would never have come to light; not because of somebody being dishonest.

E The point I have made, and which is a perfectly legitimate one, is to say there is Martin Day with his A level Physics and he spotted this that nobody else did. If he had even more knowledge, who knows what else he might have spotted and called for in consequence that has not been called for in consequence?

F My Lord, it is not the best point in the submissions, but it is a point we felt entitled to make and certainly does not cast any reflection whatever on Freshfields or their clients.

G The next point, my Lord, is simply a reminder. Mr. Rokison, on behalf of his clients, still does not accept that there is massive plutonium contamination of the area around Sellafield. Well, "massive" is a qualitative word. My Lord, at least we know that whether they call it "massive" or "modest" or "minuscule", it is sufficiently large to be unique in the Western world.

H My Lord, the next point is on the eight affidavit and whether Prof. Jones would or would not have asked. My Lord, I simply say we rest our submissions on what is in writing. It is very fully set out and, my Lord, I simply ask your Lordship, in considering Mr. Rokison's submission on that, to go through what is already there in writing without any further expansion from me and, my Lord, our submission is that, when you go through the chronology, it does make it highly unlikely that Prof.

MR. HYTNER

Jones would have asked for these B204 documents because, if he would have done, he would have asked for them before.

My Lord, the next point to make is on the new figures of Dr. Stather. My Lord, it is not sufficiently clear in the written submissions that Mr. Read did not ask in cross-examination for the red bone marrow figures. He actually asked for the lymph node figures. My Lord, it was that exercise that was objected to as being too expensive and so forth. Dr. Stather then indicated, not that he had the lymph node figures, but he had the red bone marrow figures, so that is what we have got.

My Lord, I entirely accept that there is no evidence which would entitle your Lordship to say that precisely the same factor of 4 should be applied to the lymph nodes as has been found to apply to the red bone marrow and, indeed, in the written submission it says "if you apply". My Lord, I indicated in my oral submissions, if it were found, if the Defendants found, that it simply was inaccurate - that is, there was a material inaccuracy - Dr. Stather can still be asked about it, but all we say is this: that if the dose to the red bone marrow has gone up by a factor of over 4, it is not any longer possible for the Defendants to submit that the dose to the lymph nodes must be the same. My Lord, we say the overwhelming probability is that there is an increase there as well and, therefore, the original figure cannot any longer be relied on.

MR. ROKISON: Sorry, just to clarify, my Lord, we are not relying on the original figure. The question is the difference between the increases there have been between R171 and the 1992 figures. Dr. Stather sets out what he says are the relevant doses to the lymphatic tissues in his report.

MR. HYTNER: My Lord, we accept that Dr. Stather has done that exercise for the families and the Plaintiffs. What has not been done, my Lord, is this: that, whereas we now have the figure for the red bone marrow, which has increased since the R171 Addendum, for a specific group - that is, the 1950 cohort - what we have not got, in order to make a comparison, is a similar exercise in relation, for example, to the Seascale population. My Lord, it has been done in relation to the red bone marrow for the 1950 cohort. It has been done by Dr. Stather for the Plaintiffs and their families in relation to the relevant tissues. My Lord, it has not been done for other tissues in relation to the 1950 cohort and it has not been done at all for the Seascale population.

So, my Lord, what we say is there are areas now of substantial doubt, which arise out of this exercise that has been done for us so courteously by Dr. Stather. My Lord, that is the point we make on that.

MR HYTNER

A My Lord, may I just add one reference that Mr. Read reminds me is missing. My Lord, on page 30 - my Lord, I am not going to go to the document, as long as your Lordship makes the note that on page 30, in addition to the other references to COMARE, there is paragraph 3.28 in addition.

MR. JUSTICE FRENCH: It is page 30 of whose submission?

B MR. HYTNER: I am sorry, of my written submissions or our written submissions.

C My Lord, lastly, can I deal with the alleged suggestion of Dr. Stather that the doses could be two to three times up. My Lord, page 81 C on Day 8, in cross-examination, he did say to Mr. Read what we said he said. That is, that he would not know, or he would never know, the doses. My Lord, it is sensible to read it out. It is in answer to your Lordship, in fact, not to Mr. Read. A bit tactless of me, my Lord. The best points always are the answers to the Judge, one finds. My Lord, the question from your Lordship:

"Q. 'We will never know the environmental doses'?"

D A. Yes, to better than a factor of maybe 2 or 3."

E That is page 81, letter C on Day 8. My Lord, it is perfectly true, and this is why in our written submissions we talked about his later comment. My Lord, that was, I think, misunderstood. "Later" meant later than that answer. In re-examination, later than that answer, he seemed to resile from that and said no, he was sure that he was right and that any doubts would be on the other side. My Lord, that is why we say we do not accept that and, my Lord, we are entitled to say that as we are entitled to ask your Lordship to look at the evidence as a whole and prefer the answer he gave in cross-examination to the answer he gave in re-examination.

F MR. ROKISON: My Lord, I asked my learned friend if I could just make one point. If your Lordship were to look at that passage which your Lordship has been referred to, I would invite your Lordship to look from the top of page 81 because it is clear that that answer is being given in relation to the '50s, not in relation to his assessment as a whole. It is relating to the uncertainties of the '50s.

G MR. HYTNER: Unless there is any other matter, my Lord, I think those are the points. I do not want to take advantage of the situation by making another speech. My Lord, those are the points that I picked up from Mr. Rokison.

H MR. JUSTICE FRENCH: Yes, I am grateful, Mr. Hytner, thank you.

PROCEDURAL MATTERS

Yes, I think it was probably a good thing to start at 10 o'clock this morning.

Two matters. If it would help, I made a little compilation about B-cells and T-cells, leucocytes and lymphocytes, and also a diagram which I think probably is giving the T-cell aspect, which is the counterpart of Prof. Greaves, who gives the B-cell aspect with very little T-cell. This gives T-cell and very little B-cell. I think they probably, to some extent, marry. I have found it useful, but I thought it prudent to draw it to your attention in case there are errors and omissions which are important because - I will be perfectly frank on the matter - I got it from the Penguin Dictionary of Biology. So what I propose to do is to hand you each a copy of it and your respective experts can then tell me whether it is something I ought to read with caution or whether it is something I can rely upon. I give you one each. I think one perhaps will be enough. There are more if anybody wants them. I think Mr. Butcher was looking at those with rather....

MR. HYTNER: He probably wrote it, my Lord!

MR. JUSTICE FRENCH: That concludes our business for today. What have we to look forward to tomorrow?

MR. HYTNER: Prof. Greaves in the morning, my Lord. Mr. Spencer and I - again we hesitate to put forward estimates which so often go wrong - think there will be probably a good break for coffee after Prof. Greaves before Prof. Catovsky arrives in the afternoon but we may be wrong about that, and it may be Parkinson's Law, it may be that once he is in the witness box and there is no other witness there he may take longer.

MR. JUSTICE FRENCH: Anyway, it is Prof. Greaves in the morning and Prof. Catovsky in the afternoon.

MR. SPENCER: My Lord, can I just add one thing to that and that is that there is an expert report from a Dr. Ray Powles of the Royal Marsden Hospital which your Lordship has. It is a very short report. Can I invite your Lordship to read that too in advance of tomorrow, if your Lordship has the time? He will be here tomorrow.

MR. JUSTICE FRENCH: I will read it again, yes.

MR. SPENCER: My Lord, it may well be that he will not be called but he is going to be here in the morning during Prof. Greaves' evidence.

MR. JUSTICE FRENCH: So if you decide to call him ...?

MR. SPENCER: My Lord, if I decide to call him I will be calling him straight after Prof. Greaves, tomorrow morning.

PROCEDURAL MATTERS

MR. JUSTICE FRENCH: That is tomorrow. What is the programme for the rest of the week?

A MR. HYTNER: My Lord, we have Prof. Evans, we hope, on Thursday and Friday, and Monday. I think Prof. Evans is due to be in Finland on Tuesday ....

MR. ROKISON: He was never going to Finland, my Lord, but he is not going now!

B MR. HYTNER: My Lord, my friend clearly has information that we have not got.

MR. ROKISON: These are conversations he has had with Dr. Wakeford. Apparently it was not Finland it was somewhere else, but he has cancelled it long ago.

C MR. HYTNER: We are delighted to hear that, that is a great relief.

MR. JUSTICE FRENCH: So that is Thursday, Friday and Monday. Is there any report from Prof. Evans dealing with the more up to date situation?

D MR. HYTNER: My Lord, the information I had this morning - Mr. Read may know more than I do - was that the Defendants had had the new tables and calculations but they had not yet had his comments. They are probably unnecessary but they will be coming, and they had not got them this morning. My Lord, whether they will be there during the day I do not know and I do not think even Mr. Read will know that.

E MR. JUSTICE FRENCH: Given ordinary luck I ought to have them tomorrow?

MR. HYTNER: My Lord, I would not like to make that forecast because I just do not know. My Lord, I know that he was being seen this morning by those instructing me and by Mr. Langstaff. Other than that I have been on my feet and I do not know the answer.

F MR. JUSTICE FRENCH: No. Of course, they may be very important one way or the other.

MR. HYTNER: My Lord, they may be. It is more likely, I think, that it is the tables and calculations that will have the importance rather than any observations.

G MR. JUSTICE FRENCH: Indeed, for those who find it easy to follow tables and calculations.

H MR. ROKISON: My Lord, we are a bit anxious about this and the position is this, that after the agreement on occupational doses the relevant figures were fed into a computer using a "Gret" and certain figures have come out. They are, as your Lordship will see, in some

PROCEDURAL MATTERS

A respect different from the figures that came out from earlier exercises but it is actually rather important for us to know, and again I say it in very simple, broad terms, what the Plaintiffs' epidemiological case is because it is one thing to produce figures from a computer, which incidentally have been given without any confidence limits, but it is quite another to say what conclusions the epidemiologists draw and what conclusions they will be inviting the Court to draw.

B That goes to really essentially two witnesses. Firstly Prof. Evans, because Prof. Evans is going to start his evidence on Thursday morning, but it also goes to the evidence of possibly Prof. Day and Dr. Thomas because it would appear to us, especially in relation to Dr. Thomas whose report is a report which draws certain conclusions in relation to causation from the figures which were thrown up by the earlier computer exercise  
C ....

MR. JUSTICE FRENCH: You mean the first reworking of Gardner?

D MR. ROKISON: Yes, and we have not yet seen any report from Dr. Thomas in which he makes any reassessment or invites conclusions from the latest figures. It seems to us that his earlier report has really in a sense been superseded by events and is no longer - apart from general principles which he states, for the most part it really has been overtaken by events and we do not have anything to put in its place. We have asked about that in correspondence and as I understand it we have been told that there is no intention of producing any further report from Dr. Thomas which is, to say the least, very  
E unsatisfactory. I can well understand if my learned friends say, "Well, we are not going to call him", in which case we can ignore it but the idea that he can give his evidence as to what he draws from the latest figures produced by the computer in the witness box, so that we hear them for the very first time while he is giving his evidence in chief, is obviously very unsatisfactory because we cannot possibly prepare a cross-examination of  
F a witness when we do not know what he is going to say until he gets there. The whole object of exchanging experts' reports well in advance is that you know what case your opponents are going to make.

I mention it solely because your Lordship had raised that point, and it is a matter that is concerning us.

G MR. JUSTICE FRENCH: You have made the point, Mr. Rokison.

H MR. HYTNER: My Lord, I have heard what my friend says. Mrs. Wild, my instructing solicitor who is here today, who has also been in Court all day, has heard what has been said. We will obviously pass the comments on and we will consider them but neither of us could make any useful comment on them and so I do not.

PROCEDURAL MATTERS

A MR. JUSTICE FRENCH: That is one of the reasons for raising these matters, so that they can be ventilated and if the problems arise at least the problems can be foreseen.

MR. HYTNER: Yes, my Lord.

MR. JUSTICE FRENCH: Perhaps even foreguarded against.

B MR. HYTNER: My Lord, I have no feelings of hostility against Mr. Rokison for raising the point.

MR. JUSTICE FRENCH: Very well, then 10.30 tomorrow, please.

(Court was adjourned until the following morning at 10.30 a.m.)

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