

This edition has some minor faults arising from problems converting to pdf (portable document format). Our technical department has run out of patience with it. On pages 8, 9 and 10 some arrow graphics have ended up in a heap: you'll have to work out where they should have been. On page 14 Acrobat Distiller refused to print more than half of the photo of Richard Bramhall; it wasn't even the better half.

Radioactive Times

Volume 6 Number 1

May 2005

The Journal of the Low Level Radiation Campaign

ISSN 1365-1803

Inside the circus tent

This special issue gives the full story of CERRIE – the Committee Examining Radiation Risks of Internal Emitters: How it failed and why:
How it stands in a far wider debate on science advice.



Dissident scientists head for dinner during CERRIE's International three-day workshop in Oxford

Other topics

Dose is meaningless: LLRC, CERRIE and ICRP agree
Science advice: new model; European dinosaurs
Infant leukaemia: how CERRIE failed a crucial test
Stitch-up at Church House and Health Department
New evidence from Chernobyl falsifies risk model
Cleaning up land: who will decide? When? How?
New leukaemia cluster in north Wales
Radioactive baby buggies: new threat from Europe

Line-up at Sheldonian Theatre, Oxford. CERRIE members Richard Bramhall (far left) and Chris Busby (in beret) nominated these scientists to be invited to the Workshop.

From right, Prof. Vyvyan Howard, Dept. of Foetal Pathology University of Liverpool; Prof. Alexey Yablokov, Cllr. Russian Academy of Science, President of Centre for Russian Environmental Policy, Chair of Programme for Nuclear and Radioactive Safety, International Social Ecological Union, and adviser to Presidents Yeltsin and Gorbachev; Busby; Prof. Elena Burlakova, Vice-Director Inst. Biochemical Physics, Russian Academy of Sciences; V. T. Padmanabhan of Kerala, India (lead researcher on a large study of radioactivity and birth outcomes in Kerala); Prof. Inge Schmitz-Feuerhake, University of Bremen, geneticist and radioepidemiologist.

Editorial

Once again we have to explain a long gap between issues of *Radioactive Times*. The answer is *CERRIE*; the Government's Committee Examining Radiation Risks of Internal Emitters, which was set up by Michael Meacher to look at LLRC's concerns. Now it's over and our report occupies the greater part of this issue, which we are sending to everyone on our mailing lists as well as those who have subscribed in the past.

CERRIE began in 2001 and absorbed the greater part of our resources until autumn 2004. Two unpaid representatives faced, among others, the Director and two senior staff members of the National Radiological Protection Board who had the support of NRPB's resources. BNFL's representative (another man on a salary) devoted a large part of three years' working time to the Committee, judging by the amount of paperwork he generated. Allegations of bias in the direction of the Committee emerged fairly early, not only from LLRC.

Radioactive Times reported on the early stages in May 2003, characterising LLRC as being *Inside the tent at last!* It was a circus tent, and what a circus! Animals brayed and jumped through hoops, knives flew, acrobats span and contortionists writhed. As the Grand Finale approached, the Ringmaster began to crack his whip nervously. He wanted everyone to keep in step and march round the Big Top in the same direction. Two performers protested: *The Minister who gave us the tent said we could counter-march if necessary – he just wants the audience to understand why we're doing it.* The other acrobats and jugglers agreed but in the end the Ringmaster brought in the Strong Men to frighten them into one last somersault so they would agree there could be no countermarching. The protestors had to be made to look like clowns; an experienced TV science correspondent described the abuse levelled at them as *remarkably personal*. In a closing display of fireworks the Ringmaster even attacked the Minister, calling him a bully and accusing him of choosing the wrong acts. When the last flares appeared in the *Guardian* letters page their baleful glare revealed that apart from the trampled mud in the now tentless field the landscape looked almost exactly as it always had. LLRC and Michael Meacher were still protesting that differences of opinion about credible evidence hadn't been explained, NRPB were still huddled in a defensive corner with BNFL, the bystanders were still bewildered and someone was still piping up to say a little bit of radiation does you good. The only change was that a couple of Committee members had cut their links to Greenpeace and FoE and were now huddling with NRPB and BNFL, bleating and baring their teeth.

This kind of nonsense will not do in a post-BSE, Stakeholder society. Public confidence in science advice is vital to the development of viable policy, and partisan control of Committees can only corrode what little confidence the public has. Even worse, legalistic posturing such as *CERRIE*'s Chairman deployed threatens the very freedom of scientific committees to express honest debate. Waste of time and half a million pounds of public money are the least of the problems; censorship ultimately destroys the lives of the innocent. Now that the industry is claiming to be the answer to global warming it is vital that the Government develop a new structure that ensures balance and transparency.

The Expert (Apologia and Advice)

Lib Rowland Hughes 1997

I'm one of the experts
And in case you're int'rested
I think I must tell you
My int'rests are vested

And one of the jobs
Which I do every day
Is briefing the Ministers
Just what to say.

They're sometimes all right,
And sometimes a mess;
I keep in the background
Nevertheless.

If things turn out wrong
They can always blame me
But I am anonymous
As you can see

So, pity the Ministers
They're not to blame,
But neither am I;
That's part of the game

Dose is meaningless

Old certainties are unravelling

Opinions from all sides of the debate on radiation and health are coming to agree that there are many types of exposure for which the concept of dose is virtually meaningless. Radiation may impinge on the body as electromagnetic energy (gamma or X-rays) or as particles (e.g. alpha or beta or cosmic rays) but ultimately it is mostly converted into particles (alpha particles or electrons) travelling through body tissue and creating ionisation. Committees such as the International Committee on Radiological Protection (ICRP) have historically regarded risk as proportional to the amount of energy (in Joules per Kilogramme) transferred into tissue by the absorption of the electromagnetic energy or the impact of the particles. Conventionally this is modelled as an average at the level of kilogrammes of tissue such as the lung or the whole body.

For more than a decade LLRC has said such dose averaging is like claiming that it makes no difference if we warm ourselves at the fire or absorb the same amount of heat by swallowing a burning coal.

Spatial averaging

Where all the energy is deposited in a small volume of tissue average dose is not valid. Hot particles of Plutonium are the most extreme case, since the massive slow moving alpha particles they emit traverse only a few cells before all their energy has been converted into ionisations. In 1974 American scientists John Gofman and Arthur Tamplin courted professional ruin by claiming that such particles may be 115,000 times more dangerous than estimated.

The Low Level Radiation Campaign's Chris Busby says *It's the ionisation that does the damage since the free radicals it creates are highly reactive. For some types of radiation the ionisations are well spread out in tissue – cosmic rays, for example, or the secondary electrons from gamma ray or X-ray absorption. For others, like Plutonium, all the ionisations will be highly concentrated and ICRP allow for this with a weighting factor of 20 times. It was always clear that ionisation density is a critical factor but ICRP never extended their arguments to other situations where ionisation density is large.*

Temporal averaging

A further complication is that the conventional view averages dose not only in space but in time as well. This overlooks the crucial role of cell repair

mechanisms. Busby says *Hot and warm particles irradiate the same colonies of cells over long time spans; many radionuclides, like Strontium-90, decay more than once before they become stable. These regimes increase the probability that sequential hits will overwhelm the cell repair process. You have been stabbed once, then the villain comes back and stabs the surgeon before he can finish sewing you up. How will you heal yourself?*

European Committee factors

In 2003 the European Committee on Radiation Risk (ECRR) revived a concept which the ICRP originally proposed for variations in the efficiency with which radiation causes cell death or mutation. Developing this approach the ECRR now suggests factors or multipliers which can be applied to ICRP's risk estimates.

ECRR's *biophysical hazard factors* address physical aspects. Thus external exposures such as X-rays carry a hazard weighting if they are repeated within 24 hours. This is to compensate for the possibility of intercepting the cell repair cycle. Sequential emitters like Strontium-90 and Tellurium-132 when inside the body carry weightings of between 20 – 50 depending on the number and spacing of their decays. By contrast the natural isotope Potassium-40 only decays once and therefore has a weighting of 1. Internal insoluble particles like Plutonium and Uranium Oxide have hazard weightings between 20 and 1000, depending on activity and particle size.

Biochemical hazard factors compensate for various aspects of chemistry, since many radioisotopes mimic non-radioactive substances in biological systems. This covers chemical transmutation, hydrogen bonding, enzyme seeking and enzyme amplification, ionic equilibria cations, local concentration by interfacial ionic adsorption, DNA binding, fat solubility, and barrier transmutation. Numerical values range between 2 and 50 or more.

CERRIE and ICRP agree

In UK the *Majority Report* of the Committee Examining Radiation Risks of Internal Emitters, published in October 2004, acknowledges that *Uncertainties in dose estimates will vary substantially between radionuclides, depending on their types and energies of radiation emission, their chemical form, the complexity and knowledge of their behaviour in the body, and the availability of data on which to base model parameters. There are important concerns with respect to the heterogeneity of dose delivery within tissues and cells from short-range*

The Failures of CERRIE

The UK government's Committee Examining Radiation Risks of Internal Emitters failed its remit, which was to agree a report; two were published. Here we give you the whole story.

Extensive publicity surrounding the "Euratom Campaign" (see *Radioactive baby buggies*, page 20) took LLRC into the office of the Environment Minister of the time, Michael Meacher. Our discussions persuaded him that little was known about risks from radioactivity inside the human body; conventional estimates were not valid. The Government already had a committee on radiation and health – the Committee on Medical Aspects of Radiation in the Environment (COMARE) which reports to the Department of Health – but many people see COMARE as part of the problem and Meacher wanted new advice. It was not politically possible to ignore COMARE's existence, so Meacher and Yvette Cooper, then a DoH Minister, jointly set up CERRIE to report to COMARE, though free of interference from it.

The BSE Trap

Politicians are acutely aware of the potential for biased scientific advice to cause embarrassment. Mention the Spongiform Encephalopathy Advisory Committee, which ignored scientists who said BSE could cross from cattle to people, and the temperature in the best-heated office drops ten degrees. Accordingly CERRIE was to include the full range of opinion – if necessary there was to be blood on the carpet, not more egg on ministers' faces.

There were three sides to the Committee. Some members were drawn from NRPB and the nuclear industry; others represented the green movement and scientific views which challenge NRPB; the rest were supposedly neutral academics, including the Chair, Professor Dudley Goodhead. The final report was defined at the outset as containing all sides of any

argument together with clear statements about the reasons for disagreements and recommendations for research which would help to clear them up.

Derailment bids at the start

Derailing the status

COMARE responded to the new Committee by trying to demote it to the status of a Consultative Exercise. Three years later, at the press launch of the *CERRIE Majority Report*, COMARE Chairman Professor Bryn Bridges revealed just why this would have suited him better; he said it would have given the secretariat control over the agenda and the papers to be considered. But the two Ministers insisted that CERRIE was to be a deliberative committee and, since the internet domain name *www.cerrie.org* had

already been obtained, *Consultative Exercise ...* would have to be changed to *Committee Examining ...*

Derailing the secretariat

While the membership of CERRIE was decided mostly by the Ministers, COMARE was initially responsible for selecting the secretariat. LLRC was worried. Marion Hill has a background in NRPB; Ian Fairlie was not someone LLRC trusted either, with good reason as it turned out; Katherine Mondon is a civil servant but is married to Dr Barrie Lambert, who has consistently been dismissive of LLRC's concerns. LLRC has no reason to doubt her integrity but it became irrelevant when at an early stage she stood down. LLRC asked for the appointment of Paul Dorfman to give balance to the secretariat.

The Dramatis Personae (and affiliations at the beginning of CERRIE)

In the Red Corner:

Dr. Chris Busby (Green Audit), Dr. Philip Day (Manchester University; nominated by FoE), Richard Bramhall (LLRC), Pete Roche (Greenpeace)

In the Blue Corner:

Dr. Roger Cox (NRPB), Dr. Colin Muirhead (NRPB), Dr. John D Harrison (NRPB), Dr. Richard Wakeford (BNFL)

The 'Neutrals':

Prof. Sarah Darby (Oxford University, ex COMARE), Prof. Jack Simmons (retd.), Prof. Eric Wright (ex Medical Research Council, ex-COMARE, Dundee University), Prof. Dudley Goodhead (MRC, ex-COMARE).

The Secretariat:

Dr. Ian Fairlie (Independent consultant), Marion Hill (Enviros), Dr. Paul Dorfman (University of the West of England)

The Observers:

Prof. Bryn Bridges (COMARE) Dr. Hilary Walker (DoH), Andy Macpherson (DEFRA)

Control in the middle

The most extraordinary development was the control exercised by the Chairman and Ian Fairlie over the direction of the Committee and its deliberations. A number of important studies were commissioned without reference to the Committee, and Dr. Fairlie

withheld papers which had been submitted, apparently on his own responsibility. The minutes even of the earliest meetings were so biased that LLRC began taking a DAT tape recorder to each session to ensure accuracy. Paul Dorfman was routinely excluded from decisions, paperwork and access to meeting transcripts. Finally, when Marion Hill, too, began to be excluded from the secretariat loop she resigned in a letter that accused Fairlie and Goodhead of collusion resulting in a bias to the intention of the committee. She also highlighted the extraordinary amount of money that was being paid to Ian Fairlie since for a consultancy rate of £550 per day he was doing most of the work, including menial administration which could have been done elsewhere more cheaply. In a recent Parliamentary written answer Melanie Johnson (DoH) said the total cost of CERRIE was £445,000. She declined to give a breakdown but from what we know we infer that by the end of the process Fairlie had soaked up a sum approaching half of the total expenditure. Miss Hill was never replaced.



Professor Dudley Goodhead, CERRIE Chairman (left) confers with Dr. Ian Fairlie of the Secretariat

Problem of writing culture

LLRC has no complaints about the range of topics discussed during the Committee's life, although evidence of the health impact of Depleted Uranium was excluded. The problem lay in the reporting process. Less than a year in, as the interim report was planned, it was obvious that trying to express all sides of the various issues in the form of a unified narrative would not achieve balance. Chris Busby observed *The culture of the writer always shows through. It would be far fairer to tackle it as if we were in court, with a judge and a jury who evaluate*

opposing cases. This was too radical for Professor Goodhead. In October 2002 he replied that the Committee ... *should be able to agree as to what areas are lacking consensus and on the main reasons for these. I believe that a report of this nature would be consistent with the remit we were given.* In the same letter he wrote: *In addition, any Member may, if they should wish, prepare a separate (minority) report setting out added views.* In the end he excluded Chris Busby's submission from the Interim Report and moved mountains to prevent the publication of minority views in the Final Report, as we shall see.

Into the lists at Oxford

The interim report was discussed at an international Workshop in Oxford over three days in July 2003. It was attended by people invited by the Committee and turned out to be a sustained and determined attack on Chris Busby's credibility. His advocacy skills earned him the admiration even of his critics. A Canadian Broadcasting Commission reporter who sat through all three days said he was amazed; he had been reminded vividly of Danny Kaye in the film *Court Jester* whirling about to defend himself from one attacker after another.

A report of the workshop is in the CERRIE *Majority Report*, including a list of the participants. The presentations are on the CERRIE web site www.cerrie.org. Another report is on our web site at www.llrc.org/cerrie_workshop.htm

Chairman Dudley Goodhead made an overt attempt to sideline Busby's Second Event theory (the hypothesis that radiation exposure regimes where multiple hits to cells are likely – inhaled hot particles, for example – present a far greater hazard, dose for dose, than regimes where cells are likely to be hit only once). Displaying a slide of what he called *the specification of the theory*, Goodhead invited the audience to *agree that none of the bases for the theory are real, and that it can be*

dismissed from further consideration. Nobody did agree. Some said it was worth testing experimentally and a notable opponent of Busby's views admitted the general principle, citing five recent papers which provide evidence of increased hazard from two hits.

Battle at the end

The International Workshop's most serious and consistent criticism of the Interim report was that while it identified differences of opinion it failed to explain the reasons for them. This shortcoming seems all the sharper in view of the Chairman's earlier

confidence about reporting disagreements, but as the Final Report stage approached in late 2003 CERRIE remained committed to the single narrative. Internal correspondence reveals the view that *the secretariat will need to write most if not all the main text, plus the summary and extended summary. This is the only way a balanced and reasonably uniform text can be achieved in the time available. Anyone disagreeing strongly enough will have to submit a minority report.* Draft chapters on epidemiology and radio-biology were written accordingly.

At this time Professor Goodhead began to give hints about the degree of editorial control he was prepared to exercise. He had spotted a motto carved in an old bench at Bramhall Hall in Cheshire. He quoted it first in conversation with Richard Bramhall:

*He that will not
When he may
When he will
He shall hath nay.*

Bramhall says *Dudley was obviously pleased with the coincidence of the names but my ancestors were Sheffield artisans, not Cheshire landowners. Anyway, as mottoes go it sucks. I prefer the Norman French battle-cry of my grandmother's family – "Tous foys prester". It means Always ready!*

LLRC submitted extensive amendments to the drafts but they were rejected. At the 14th meeting in March 2004 Busby and Bramhall once more argued the *writing culture* point and proposed to rewrite their amendments as separate dissenting chapters. The Committee agreed unanimously.

Shifting goalposts

April 2004 saw intense negotiations. The Chairman, who had complained about *potential libels* and *offensive material* in the amendments, would not say what was libellous or offensive despite repeated requests. *Errors* had also been mentioned but were never specified, and he refused to address the content of the dissenting chapters. He did, however, shift the goalposts on how long they might be, at first stipulating that they should not be longer than the chapters from which they dissented, and then demanding that they should be substantially shorter. Busby and Bramhall felt this was unfair, since one of the major problems with the main report was that it gave scant attention to some important topics.

The CERRIE Majority Report can be downloaded from www.cerrie.org

Hatchet job

Greenpeace representative Pete Roche intervened with what he called *a fairly quick and dirty hatchet job* on what LLRC had written, reducing it to a quarter of its length – a bigger cut even than the Chairman had required. Since Roche had dumped entire topics Busby and Bramhall declined to endorse his version. (This was later minuted as a refusal to accept proffered help.)

Quoting his new motto several more times Goodhead ratcheted up the pressure on LLRC to conform with his view of what the Committee wanted. In early May he emailed to Bramhall:

If you cannot grasp this opportunity in a constructive way that is consistent with the discussions, decisions and spirit of the Committee, and consistent with the remit from the Ministers for a concensus report, then you might have to consider the possibility that the committee is not prepared to include your authored contributions at all. I very much hope it does not come to that, but there are very likely, and properly, limits beyond which the committee will not be pushed for a report that is to come out in their names as members of CERRIE. (Perhaps that inscription from Bramhall Hall they I included in my recent email to members, is more apt than I thought! In essence, grasp this excellent chance when you have it, or you might have nil.)

At this stage the Chairman commissioned Paul Dorfman to review the dissenting statement with a view to editing out anything that might be actionable. Dr. Dorfman sent his version to a barrister, who said it contained nothing libellous. LLRC endorsed it and it was emailed to all Committee members. At the next meeting its inclusion in the Final Report was agreed. All members were present, only the BNFL representative voted against and there were no abstentions. On the train home to Wales Busby and Bramhall 'phoned ahead to have a bottle of champagne put in the fridge.

Legal posturing

The bubble soon popped, for Professor Goodhead had another move to make. He emailed Committee members to say he was consulting Government lawyers and would provide their legal opinions at the last meeting. This he did, as the last item of business. The unnamed lawyers echoed Goodhead in referring to potential libels. Like him they did not say what was, or might have been,

libellous. They warned that if a report that contained libels were published, liability would potentially attach to everybody connected with it – all the members, the Departments, the printers, the distributors. The same thing applied to *negligent misstatements on factual matters*, and Bryn Bridges recalled that a pharmaceutical company had once sued a member of the Committee on Safety of Medicines for alleged misstatements of fact published in a CSM report. There were nervous jokes about the threat to members' pensions and homes, and some discussion of the implications for scientific committees and their freedom to report legitimate debate. The lawyers had not identified any mistakes or misstatements; Bramhall asked once more what errors there were, and the meeting descended into farce as members tried and failed to pin some down. One error alleged by Professor Goodhead concerned the protocols the Epidemiology sub-Committee had adopted for a study of cancer near the Bradwell power station, and the question of why the Secretariat had failed to obtain data needed for the study. Goodhead was surprised to find BNFL and LLRC agreeing with each other and tried to change the subject. Bramhall asked him not to: *Please Dudley, let's not go to anything else until I've had my say on this, because a clear agreement was reached in May 2003 and nearly a year elapsed before that issue was revisited, during which time the data were not obtained. I think the big question is why they weren't.* The tape of the meeting shows Goodhead thrown into confusion by this, but Friends of the Earth nominee Phil Day came to his rescue; *Can I suggest or perhaps propose that we adjourn for five minutes on the basis that there may then be a proposal which might cut all this short?*

Day's killer blow

After a short break Day's proposal turned out to be nothing to do with libel or whether Committee members were at risk of being sued for damaging the commercial interests of a polluting industry; he moved that all versions of LLRC's dissenting material should be excluded from the final report because they did not adequately identify the grounds of dissent. He was seconded by Professors Eric Wright and Jack Simmons and by Pete Roche. Goodhead allowed no discussion and went straight to the vote. NRPB abstained but LLRC was outnumbered. The meeting – the Committee's last – came swiftly to an end with Bramhall and Busby saying they would not sign up to the censored report.

See www.llrc.org/minuteman.htm for a forensic analysis of the last part of the last meeting. It includes a partial transcript of the tape and a link to the alleged Minutes of the meeting which are a mendacious attempt to blame LLRC for the Committee's failure. LLRC has high quality audio recordings of all the meetings – very revealing and probably unique in the history of science advice.

Richard Bramhall observes that since the Committee's members were human their culture was bound to act as a filter of their perceptions of the science. *But this, he adds, doesn't explain why some of them voted in favour of a dissenting statement at one meeting but found it totally unacceptable at the next.*

Busby points out that the Majority Report's treatment of the sharp increase in infant leukaemia after Chernobyl certainly qualifies as negligent misstatement. *They got the doses wrong, the statistical analysis was wrong, and they left out a lot of the data. Their clear intention was to deny unequivocal evidence of a massive underestimate in the risk factors, but no fat-cat corporation is going to sue them on the children's behalf.*

LLRC's legal advisers have said that in the absence of specific criticisms all the posturing about libel and negligence was clearly intimidation.

Many people have asked LLRC about the Greenpeace man's motives. Bramhall says *That's a matter for Pete Roche to explain. What I will say is that he now goes about advising his clients that the scientific uncertainties justify invoking the Precautionary Principle. That stance is only weakened if he vilifies people who present good evidence for a yet more precautionary approach. One has to ask why he does it.*

Toxic fallout

In July the content of the Majority's report was leaked to *New Scientist*, four months before publication. Goodhead informed Committee members that he gave *New Scientist* a statement because it was inevitable that they would cover the story. They trailed their exclusive widely, headlining *scientific uncertainties* which meant Plutonium could be ten times more dangerous than had been thought. Many newspapers echoed this line. In a letter to the *New Scientist* LLRC said it was unscientific; CERRIE had in fact identified many uncertainties which had to be multiplied giving a total uncertainty range of some

tens of thousands, while disease in exposed populations was evidence of an actual error well within that range.

Other media coverage through the summer of 2004, both before and after publication of LLRC's *Minority Report*, was less civilised. On BBC Radio 4 Phil Day said Busby talked *absolute garbage*; an unnamed Committee member told the *Sunday Times* LLRC were *ardent anti-nuclear campaigners whose extreme views had polarised the Committee*; Day, Wright and Roche emailed hundreds of people repeating the lies that LLRC *had been unable to cooperate with their colleagues on the Committee in producing a unified report and were given every opportunity, short of breaking the laws of libel and negligence, to incorporate their views in a dissenting statement*. At the press launch of the *Majority Report* Goodhead called Busby a flat earther and in an *Observer* article and letters to *The Guardian* he and Professor Bridges accused Michael Meacher of bullying and political control of the Committee. Meacher refuted this, insisting that he wanted scientific explanations, especially of the post-Chernobyl infant leukaemia. He made this point several times. Goodhead replied with a further personal attack on Meacher. Throughout it all were continual assertions that LLRC's work was *riddled with errors*, and references to negligence and libels which were never substantiated. Pete Roche told the *ENDS Report* the dissenting material *was not included because it was not factually correct*, and he added *I have to keep on reminding myself I'm campaigning against nuclear power and not against Richard Bramhall and Chris Busby*.

Understatement

The CERRIE report does not always clearly set out the reasons for lack of consensus.

COMARE 9th Report

Was anything achieved?

The Committee's very existence highlighted the existence of major flaws in the basis of the radiation protection standards which regulate nuclear processes all over the world.

It showed beyond dispute that the old Whitehall control culture, which prefers to appoint a safe Chairman and to exclude dissenters, could not cope with gathering science advice in a more open, accountable and balanced way. An Early Day Motion in the last Parliamentary Session called for a new model (see box on page 19).

Third, since even the *CERRIE Majority Report* says explicitly that in many circumstances the old concept of radiation dose is meaningless, the public now has a simple and powerful tool for questioning the bland reassurances of bodies which have no choice but to express risk in terms of dose. So, when the Environment Agency tells us radioactive discharges only give us a tiny dose, we may now ask: *Dose? Dose to what tissue, exactly? ... from what radionuclide? ... from what size of particles, exactly?* And so on.

For media coverage during summer and autumn 2004 and the letters published in the *Guardian* see www.llrc.org/health/subtopic/cerriepostlaunchattack.htm

CERRIE Minority Report **Sosiumi Press Aberystwyth**

ISBN 0-9543081-1-5

The *Minority Report* was published in September 2004 by Sosiumi Press.

It consists of the final version of Bramhall and Busby's material – that which CERRIE accepted for publication in May and which Paul Dorfman then refined at the Chairman's request. In addition it has a preface by Michael Meacher and the letter in which Marion Hill explained her reasons for resigning from the Secretariat.

Russian scientists advised CERRIE to take good note of thousands of Russian studies on the consequences of Chernobyl. This was ignored but the *Minority Report* summarises nearly a hundred books and papers, most of which show increases in malignant and non-malignant disorders in the Chernobyl-affected territories. The scale of the implicit error in conventional radiation risk estimates is two orders of magnitude (this is consistent with child leukaemia in Seascale and many other epidemiological findings.) The Russian experience is a shocking indictment of the intransigence of international agencies.

The cover price is £25

but £5 to campaigners and students.

Available from LLRC, The Knoll, Montpellier Park, Llandrindod Wells, LD1 5LW

Cheques payable to *Low Level Radiation Campaign*, please.

Science advice – the wider context

The CERRIE débâcle is part of a bigger debate about the nature of science advice. Over the last two decades the literature of science and technology studies has rehearsed extensively the idea that *Any approach to environmental control which ignores the knowledge, expertise and imagination of the bulk of the population will be seen as extremely restricted.*⁽¹⁾ The Ministers who set up CERRIE were fully aware of this need for balance and inclusiveness. Another example is the Agriculture and Environment Biotechnology Commission (AEBC).

Scientific assumptions

AEBC was set up a year earlier than CERRIE, following a Cabinet Office and Office of Science and Technology review of the advisory and regulatory framework for biotechnology. With a remit that included ethical and social issues as well as the science, it was not strictly analogous to CERRIE; CERRIE's Chairman Dudley Goodhead and the majority of members flatly refused to discuss ethics or scientific philosophy and method. Richard Bramhall said *Scientists' reasoning may be far more primitive than they would like to believe, and authorities such as Nobel laureate Michael Polanyi have described how closed scientific communities use epicyclical logic to exclude experience. We argued that radiation risk is a prime example. The Chairman rejected our submission.*

Nevertheless Dr. Les Levidow, editor of the journal *Science as Culture*, told *Radioactive Times*, *Perhaps CERRIE has played a role of opening up the value-laden (and perhaps policy-laden) character of regulatory science. In such a role, "scientific" credentials of members may be less important than their assumptions about "science"*.

Significance advance

It is widely agreed that AEBC has done its job and it has now been wound up, but in its five years of life it made a significant advance for science policy. Reviewing the Commission in a letter to the Office of Science and Technology, Dr. Levidow and Dr Sue Oreszczyn of the Open University's Centre for Technology Strategy said, *The open way in which it [AEBC] operates is exemplary and is setting new standards of transparency. Importantly, the AEBC is giving legitimacy to factors other than the science; such breadth is important for building confidence in government decision making.*

In contrast to CERRIE's ultimate dissonance, AEBC achieved consensus. Members felt, moreover, that it had been perfectly possible to balance the Commission's role as an analytical investigative body with its function as a stakeholder consultation: *"Coexistence and Liability" as a consensus report had done just that [balancing]*, wrote AEBC's Chairman Professor Malcolm Grant.

Responding to Professor Grant, Ministers Patricia Hewitt and Margaret Beckett agreed that the Government had to preserve and take forward the Commission's experience and ways of working, especially its independence, openness, transparency, public engagement and reporting.

Bramhall feels the AEBC put CERRIE in a poor light: *Although CERRIE's subject area carries far more historical baggage and inherited liabilities than biotech, our task should have been simpler – "agree what you can, explain what you can't, and suggest research to resolve the disagreements"*.

Handbags again

A recent BBC report⁽²⁾ drew the parallel between AEBC and CERRIE and explored the implications for future science advice. Professor Goodhead attacked his own Committee, criticising it for *bad construction. One member*, he said, *Was not a scientist at all, but was there solely for a political agenda.* Bramhall is scornful of what he sees as revisionist blame-shifting: *Dudley knew the Committee's structure when he agreed to chair it; members' status and affiliations were laid out at the start.*

In the BBC report Bryn Bridges said he understood the desire to be inclusive but lobbyists had to show honesty and integrity and resist the temptation to spin evidence. Professor Philip Dale, leader of the Genetic Modification and Biosafety Research Group at the John Innes Centre in Norwich who resigned from the AEBC in December 2004, said there was a need for a new scientific advisory system with a core judicial group. On the following pages we reprint a *RaT* review⁽³⁾ of Green Audit's 2000 paper *I Don't Know Much about Science* which, recognising the cultural problems of Whitehall committees, outlined just such a system.

References

- 1 *Citizen Science*, Alan Irwin, 1994
- 2 BBC Radio 4 *Today* 08.50 17 March 2005
- 3 *RaT* Vol. 4 No. 2 November 2000

I don't know much about science ...

...But I know what I like

The Low Level Radiation Campaign realised a long time ago that in addressing the accepted scientific model underlying radiation protection standards it is playing the same public role as the small boy in the story of the Emperor's new clothes.

But there's a big difference. In the story the central myth collapses as soon as one person has the nerve to shout out *The Emperor is naked!*, while in reality a scientific paradigm, however weak it is, doesn't collapse until a critical mass of people is pouring scorn on it. The little boy has a lot of persuading to do.

LLRC and Green Audit have sunk a few pints over this, and conclude that a good part of the problem lies with the sources from which governments get their scientific advice. Working on the possibly flawed assumption that Parliament can influence policy, they sent a questionnaire to British MPs to see just what qualifications they have in scientific and technical subjects. Over a quarter of respondents had none - not even maths O-level. And this was just the Members who had replied; Green Audit estimates that for all MPs probably around a third are not scientifically or mathematically literate.

Their report ⁽¹⁾ observes that: *People who do not have O-level maths may find themselves struggling with concepts such as ratios and percentages, never mind such technicalities as the statistical significance of research findings or inferential statistics. Does this matter? For many political decision, perhaps no. But in a world*

increasingly affected by scientific and technical knowledge those who are unable to understand basic concepts are at a great disadvantage. They are prisoners of the advice given by scientifically literate civil servants, expert committees, and lobbyists whose interests may be tied to transnational companies.

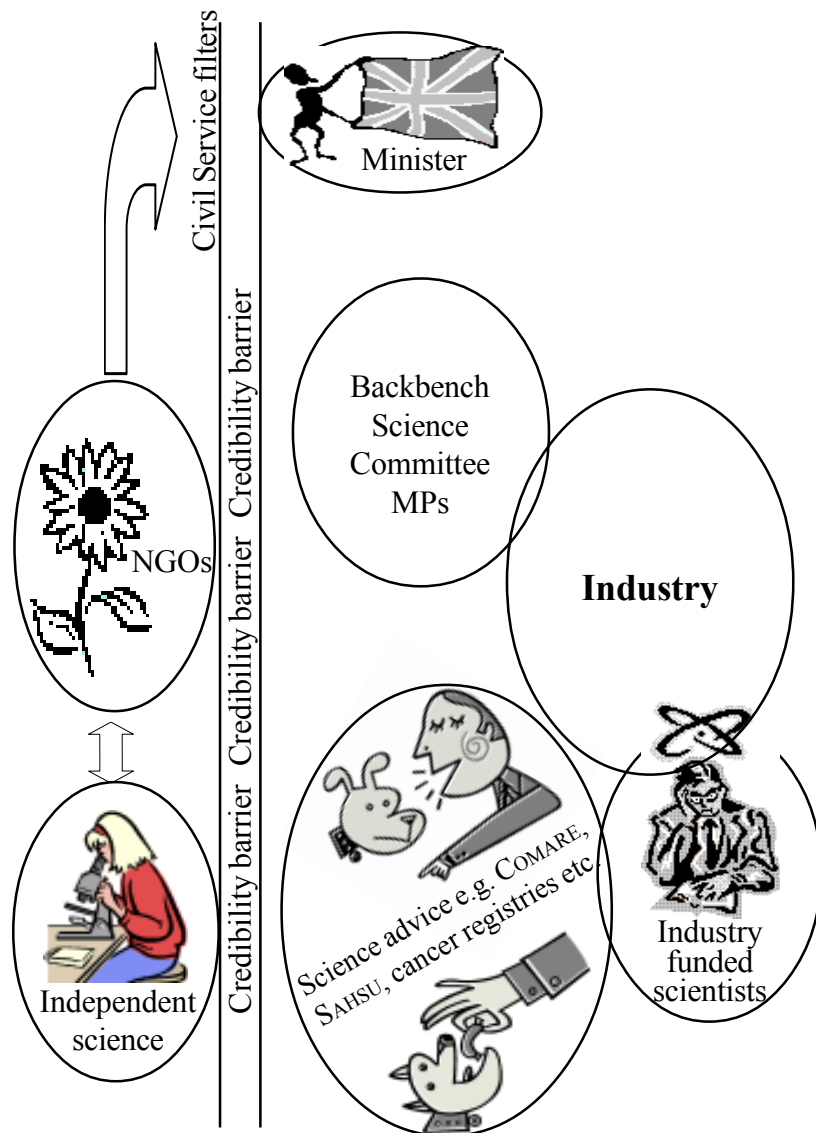
And the problem is not confined to rank-and-file MPs - Baroness Symons, for example, is a Minister, an ex-First Division civil

Reprinted from *Radioactive Times* Volume 4 No. 2; November 2000

servant and by all accounts extremely intelligent. She was recently asked whether she had read the reports criticising the safety records of Lockheed Martin and BNFL before taking the decision to hand them the contract to run Aldermaston.

The Baroness said:

I wouldn't necessarily understand the individual bits. I have the humility to say that I am not a nuclear scientist, but there are those who are and who understand



the reports in full, I have to rely on those with real expertise.

The implicit assumption is that the “experts” will not have become biased by their contacts with or employment in the industry or as a result of their education in nuclear physics.

And it’s equally unlikely that Baroness Symons would consult experts who are just as capable of understanding “all the individual bits” but who are linked with Greenpeace, Friends of the Earth or NAG - the ginger group based near Aldermaston.

According to Green Audit, the official view is that NGOs, industry and independent committees like COMARE have equal access to committees of MPs and hence equal influence on the decisions of responsible ministers. But in reality there are filters and pressures which amplify pro-industry views and attenuate the voices of critics. Pro-industry bias on the “independent” committees can be seen, for example in Ray Baker’s enthusiasm for genetic modification trials (Baker is the head of the Biotechnology and Biological Science Research Council):-

.... we need to build even more confidence in this technology and it is vital to increase the size of [the experimental] trials.

At the same time the lack of funding of truly independent research means that its results suffer from a credibility deficit, and a highly efficient filter system exists to block ministerial faith in (or even awareness of) the opinions of NGOs and local interest groups. LLRC has first hand experience of this, and has been given reliable insights into the inter-departmental networking of civil servants intent on maintaining the status quo.



Minister
Two separate reports



Backbench Science Committee MPs
or two-part report



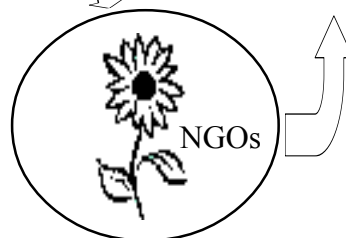
Funded citizen scientists



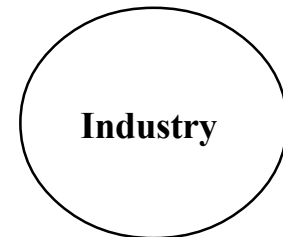
Funded scientific advice unit



Industry funded scientists



NGOs



Industry

Present reality

The reality of the present system is shown schematically on the previous page. Industry, the research it funds, and the government committees have an unhealthily close relationship. A credibility barrier and civil service filters stop pressure groups and the small number of independent scientists gaining access to the political process.

Green Audit concludes that any search for objectivity is a confusing waste of time. Anybody whose opinion on a subject is worth having can be expected to bring some baggage with it too. What is needed is a system which accommodates the baggage in the same way that the British system of

justice accommodates irreconcilable points of view by testing them - trying them - before a judge and jury. The British Parliamentary system offers another analogy, since its greatest strength is seen as the way the opposition tests legislation by subjecting it to bombardment.

Green Audit’s proposed framework of oppositional scientific advice is shown above. Government funds a Scientific Advice Unit which commissions and funds Citizen Scientists to undertake studies and review the evidence on specific areas where advice is needed. The system must ensure that the final decision makers have seen reports or abstracts from all sides of the issue.

Reference

1 *I Don’t Know Much about Science: Political Decision Making Involving Science and Technology*. Scott-Cato M, Busby C, Bramhall R; Green Audit Aberystwyth 2000 ISBN 1 897761 21 X. This is out of print now but is online and free to download at www.greenaudit.org.

Science advice – the European loop

The European Union has a very clear preference for conventional advice on radiological protection, and a very closed system for getting it. The Council of the European Union, consisting of Ministers representing national governments, is the EU's law maker. The 1957 Euratom Treaty requires the Council to consult the European Commission and then to appoint a Scientific and Technical Committee (STC). The Health and Safety chapter of the Treaty requires the STC to appoint a group of experts - the *Article 31 Group* – to advise the Commission. This is how Directives on Basic Safety Standards are derived.

In November 2004 the Council appointed a new STC. They announced the names of 37 members but their affiliations and qualifications for the position are a mystery and not even nationalities are identified. These people will soon appoint a new Article 31 Group of Experts; experience shows that its membership will be equally opaque.

The only way to get new blood into this closed system is to lobby the EU Member States' national Government Departments and the Ministers who address radiation protection within the Council.

In January LLRC asked the Commission's Radiation Protection Unit in Luxembourg if there is any way to present evidence directly to the Experts. Head of Unit Augustin Janssens replied: *While you know that we are very much in favour of stakeholder involvement, this is not the role of the Experts: it is for us, the commission services, to allow for opinions in addition to scientific advice.*

Richard Bramhall says: *So, what Europe gets from its incestuous loop is "scientific advice". Everything else is "stakeholder opinion" and the Commission is the gatekeeper.*

Dr. Jochen Naegele, secretary to the Article 31 Experts, claimed that the Group was balanced. Evidence of this, he said, was a conference in November 2004 at which members of the Group had criticised the ICRP's new draft Recommendations. *You may understand from this procedure, said Dr Naegele, That a balanced view was therefore fully ensured.* The Experts' comments can be seen on the ICRP web site.

Anodyne and outdated

LLRC was not impressed. The Experts' conclusion was that *It should be underlined that very small doses (below 0.010 mSv) are only a small increment to the natural background, so that the*

biological effect is bound to be proportional to this increment. This is not a matter of biology but of mathematics. LLRC wrung its hands at this manifestation of the ridiculous *Health Physics* mindset - even the CERRIE Majority and ICRP itself are more radical (see *Dose is Meaningless*; page 1). We asked for a meeting with Dr. Naegele and his boss Mr. Janssens to discuss these out-of-

date views and the EU's closed system of scientific advice, but unfortunately the Radiation Protection Unit is so small and so under-resourced that illness and compassionate leave have prevented them giving any reply for two months. During this time, of course, the STC inched towards choosing its new Experts; a meeting was due in April, its agenda remains secret.

Cold War relic

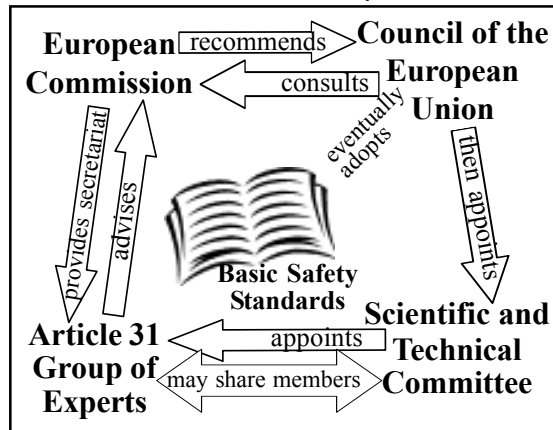
The Euratom Treaty is a relic of Cold War thinking and the concomitant adherence to nuclear power. It should have been extinguished by the new mood of involving a broad range of opinion in policy-making. Here are some relevant bits from the European Commission's 2001 White Paper on European Governance, the basic message of which is that *We* (i.e. European institutions and Member States) *need to govern ourselves better, together.* The White Paper underlines, in particular, the intention to *reduce the risk of the policy-makers just listening to one side of the argument or of particular groups getting privileged access.*

It goes on [*The*] *quality of [...] EU policy depends on ensuring wide participation throughout the policy chain – from conception to implementation.*

and The [European] institutions should work in a more open manner [...] in order to improve the confidence in complex institutions

and Each of the EU institutions must explain and take responsibility for what it does in Europe.

Right then. We should be pushing at an open door. Maybe. We'll send out a briefing for activists soon, and don't forget www.llrc.org.



Infant leukaemia after Chernobyl

Crucial test, crucial failure

After the Chernobyl accident in 1986 there was a sharp increase in infant leukaemia. As early as 1988 scientific journals began to publish papers by different research teams. They showed that in Belarus, Greece, Germany, Scotland, Wales and the USA during the months after the accident incidence increased by between 20% and 330%. This was one of the main reasons for the establishment of CERRIE and was a key piece of evidence laid before the Committee. The *Majority Report's* treatment of it is a scandal.

Miners' canaries

Leukaemia is recognised as an early response to radiation damage; more specifically, infant leukaemia (i.e. diagnosed before a baby's first birthday) signals damage acquired in the womb. This is an unequivocal challenge to conventional risk estimates because, 'though Chernobyl doses were small, nothing else can have caused the disease in this very precisely defined subset of the population. The number of sick babies was small but they are miners' canaries, suggesting that radioactive discharges are contributing to the global epidemic of cancer. Their tragedies will become a far greater scandal if the world's governments fail to learn by them.

Real risks, notional doses

The vertical axis of the graph opposite shows percentage increase during the 20 months between the accident (26 April 1986) and January 1988, compared with the period before it and from 1988 onwards.

The horizontal axis shows doses. At between 0.02 and 0.2 millisieverts they are small fractions of average annual natural background radiation, but the big caveat here is that *dose* may mean nothing since it is calculated from Caesium fallout. Caesium emits highly penetrating gamma rays, so it is easy to monitor. For this reason it was extensively mapped after the accident, giving researchers a way of estimating doses. But the very fact that it is so penetrating means that its energy deposition (in the form of ionisations) is spatially well distributed in tissue, so its health effects are likely to conform with the external irradiation models. It is, moreover, soluble and does not form particles. The Chernobyl reactor fire produced other isotopes (including Strontium-90) as well as microscopic particles of reactor fuel which

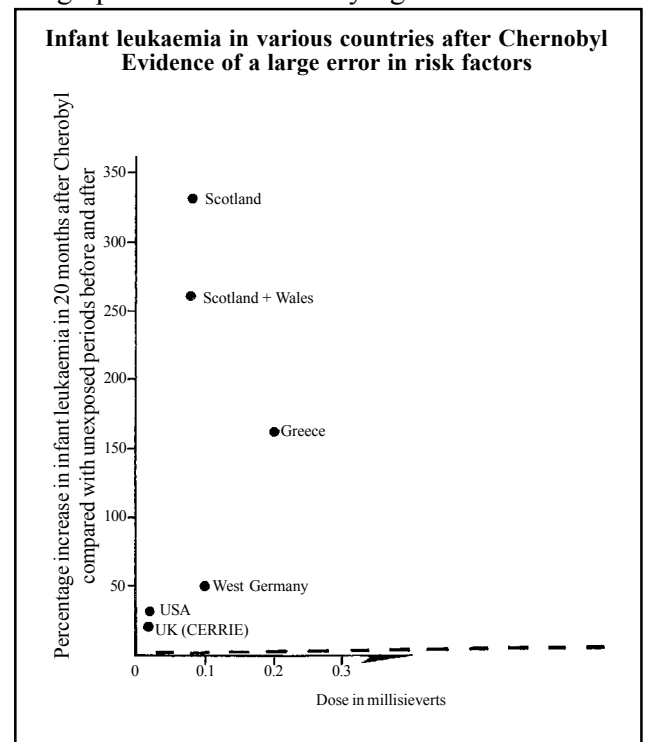
travelled across Europe and beyond, exposing everyone in the path of the cloud to inhalation and ingestion. There is no reason why the health effects should conform with expectations based on Caesium deposition.

The dotted line on the graph shows the percentage increase in leukaemia CERRIE's majority would expect for any given dose. It slopes up towards a point representing a 40% increase at a dose of 10 millisieverts (This is five times natural background, and the graph would have to be almost a metre wide to show it). The origin of this yardstick is cancer deaths in children after their mothers had been X-rayed during the pregnancy. X-rays are external exposures, so the yardstick itself is part of the model CERRIE was asked to investigate.

CERRIE turns a blind eye

All the post-Chernobyl studies show between 150 and 800 times more leukaemia than expected. LLRC argued that this was *prima facie* evidence against the external risk model (the dotted line). Our opponents on CERRIE set out to show it could be ignored. They argued that the statistical power of the individual studies was so low that no reliance could be placed on the overall observation.

One strand of this argument depends on ignoring studies of Scotland and Wales. They can be seen in the graph and are statistically significant.



The second strand began with using wrong data and ended in nonsense. The first draft of the CERRIE *Majority Report* said radiation doses in Germany were the same as in Greece. This had the effect of reducing the apparent significance of the German study and the draft concluded that ... *the only study to show a large discrepancy with the predictions of external radiation risk estimates is the Greek ... study.*

However, we knew from published UN data that fallout in Greece was roughly four times higher than in Germany. We told the Chairman that the stated doses were obviously wrong. The report was then changed before it was published in September 2004; it now contains the correct doses but, untenably, still concludes that only the Greek study is out of line with expectation (a mistake repeated parrot-fashion in the Journal of Radiological Protection's CERRIE review⁽¹⁾).

The third strand of the CERRIE case is an unsubstantiated slur on the quality of data collection in Greece. This was never discussed in Committee, but the implication is that the Greek study can be ignored.

The fourth concerns the study from Belarus (not shown on the graph), where fallout levels from Chernobyl were more than seven times higher than in Greece 'though the increase in infant leukaemia was smaller than anywhere else in mainland Europe. The report says the Greek study (the only one supposed to be an anomaly) is *statistically inconsistent with ... the study in Belarus where the highest doses from Chernobyl contamination were received.*

Clinging to the *linear* dogma

The *statistical inconsistency* between the Greek and Belarus findings is jargon; it means that the studies challenge the dogma that dose and effect are always strictly proportional or *linear*, or in other words: *twice as much dose means twice as much cancer.* We had consistently argued in CERRIE that there are good reasons why disease may not always show simple relationships with dose. Infant leukaemia is just one example. Babies carried by pregnant women in high fallout areas will suffer more damage than in low fallout areas. As a result more babies will be miscarried or stillborn or will die before leukaemia is diagnosed. A high fallout area will therefore inevitably have lower incidence of leukaemia **per unit dose** than a low dose area. It may be **absolutely** lower, as in the case of Belarus. (Many reports from Chernobyl-affected territories show non-linear relationships with dose – see the CERRIE *Minority Report's* Appendix of papers from the ex-USSR.)

Ignoring scientific method

Thus, by a combination of wrong and selective data, innuendo and dependence on assumptions which CERRIE had been set up to test, the *Majority Report* finds that the increase in each country could have happened by chance, so the overall increase could have happened by chance. This ignores the classic scientific dictum of *instance confirmation*; that is, studies which consistently show a trend increase our confidence that the trend is real.

The Chernobyl infants' studies satisfy most of the features of reliable epidemiology laid out by Professor Sir Austin Bradford Hill in an influential lecture in 1965⁽²⁾. [References are inside back cover]

Statistical significance

According to Bradford Hill *statistical significance*", so crucial to CERRIE's dismissal of the infant leukaemia, is of minor importance. Nonetheless, we can amalgamate the statistical tests contained in the various studies. The Scottish, Greek and German studies combined, for example, have a "p" value of 0.00065, meaning that an event on this scale occupying a two year period would not happen by chance in more than two thousand lifetimes. And if, as CERRIE claims, the events were truly random, common sense says at least some of the data points would have been below the dotted line.

Four-way split not explained

CERRIE never went through an open process of identifying members' opinions (which shifted unaccountably inbetween drafts of the report). On this one issue the *Majority Report* shows a bizarre four-way split. (The text is in a box on the next page). One faction, of unknown size, seems to think Chernobyl had no effect on how many babies got leukaemia. Most members thought it did have an effect, but there were three opinions on its size. Some thought all the data points could be interpreted as lying on the dotted line in the graph. Others thought the risks were higher, but the report doesn't say how much higher, nor who thought so, nor why. Two members (LLRC's representatives) insisted that the various scientific papers unequivocally show radiation is at least 100 times and maybe up to 1000 times more dangerous than conventional estimates. The majority felt there was *relatively little evidence* supporting our view. *Relative* to what is not explained.

CERRIE's weird conclusion on leukaemia after Chernobyl

In the judgement of a large majority of Committee members, it is likely that radioactive fallout from the Chernobyl accident resulted in an increased risk of infant leukaemia in the exposed populations. A substantial fraction of members thinks that this increase is at the level anticipated from current risk models. However, another substantial fraction feels that these models may have underestimated the level of this increased risk. Of this latter group, two members further believe that the evidence for infant leukaemia suggests that the current risk estimates are appreciably in error. The remainder of the Committee believes that there exists relatively little evidence that lends support to this view. There is a consensus within the Committee that leukaemia incidence in infants post-Chernobyl merits further study.

CERRIE Majority Report Chapter 4 para. 26

Flunking the remit

The Committee's remit required differences of opinion to be explained, but the *Majority Report's* account of this wide divergence leaves the reader guessing. The implications are huge, for if the risk factors are so grossly in error we have an explanation not only for the Seascale leukaemia cluster but for the global epidemic of cancer which started when the nuclear industry began to spread radioactive pollution around the planet. On this key issue, as on many others, the report completely fails to produce any reliable advice for policy makers.

COMARE complicit in cover-up

Despite the opacity of CERRIE's treatment of the Chernobyl infant leukaemia, the Committee on Medical Aspects of Radiation in the Environment was fully aware of its importance. Its Chairman Professor Bryn Bridges attended every meeting of CERRIE as an

observer. Professor Eric Wright was a member of both CERRIE and COMARE and also sat on the COMARE sub-Committee shadowing CERRIE. But COMARE's 9th Report, which advises ministers on CERRIE's findings, contains not a word about the infants.

Bridges retired as Chair of COMARE at the end of 2004 but he defends his report against this criticism. In an email to LLRC he cites a paragraph which refers to the forthcoming European Childhood Leukaemia/Lymphoma Incidence Study (ECLIS). This he says will investigate trends in incidence rates of childhood leukaemia and lymphoma in 20 European countries, in relation to [...] Chernobyl [...] Such large studies are much more likely to produce firm results than those proposed in the CERRIE report. This is just the kind of evasion we expect from COMARE. As ECLIS is unpublished it does not falsify studies published up to 18 years ago. CERRIE's own study is part of the body of evidence which the *Majority Report* so blatantly misrepresents.

Child leukaemia postscript

The CERRIE *Majority Report* says that although risks of infant leukaemia were increased by Chernobyl the increase didn't feed through into incidence beyond the first year of life. This is yet another argument for ignoring the infants. However, we have now data for Wales and Scotland which shows it is false.

We have plotted incidence in children up to the age of 9. It shows that the cohort born in 1986 – '88 has roughly a 50% greater risk of leukaemia than children born before the accident. A paper is being prepared for publication but Chris Busby reports that he is having difficulty getting data to complete it. The data would give the total number of cases diagnosed each year, broken down by the children's ages. Thus, for example, we might see one eight-year-old in Scotland in a particular year. The Cancer Registries are now claiming that if they release the figures someone might be able to identify some of the children which would compromise their patient confidentiality. Busby has referred the matter to the Information Commissioner under the Freedom of Information Act



Sam died of cancer in September.

Essex incineration fight goes on

Bradwell Power Station dropped plans to incinerate contaminated trash after a vociferous local campaign, but 14,000 gallons of contaminated liquid waste remain and are to be burnt over the next months. Local opposition goes on. Objectors include Julie Salter of nearby West Mersea, who has always exercised her dogs by the sea. Three died of cancer caused, she believes, by power station discharges. She says there are high rates of cancer in dogs in the area. LLRC has heard such reports from many parts of the country.

Clinical waste and cancer recycling

In the last session of the CERRIE International Workshop American geneticist Eric Hall said *What about the medical uses of radioactivity? We push Curies up the pipe!* [A Curie is 37,000,000,000 radioactive disintegrations per second.]

The Chairman responded by proposing that the Final Report should state that it did not concern clinical practice. In the next Committee meeting Richard Bramhall said many of the Committee's deliberations were directly relevant to the discharge of clinical waste. *It doesn't make any difference if you acquire your body burden of radioactivity from a power station or because you live downwind of a hospital incinerator. The Committee agreed with me but the matter was not minuted and once we were into*

drafting the Final Report I had to argue it again and resist the Secretariat's attempts to dilute it.

The CERRIE Majority Report as published⁽¹⁾ states that its considerations do in principle apply to internal radiation from clinical practice.

Bramhall says *Clinical practice involves disposing of large amounts of radioactivity by direct incineration and by disposal to sewers; sewage sludge is often incinerated too. Since radiation risk factors are now seen to be seriously in error these emissions should cease – they are turning our hospitals into cancer recycling centres. We have advised CoRWM to concern itself with new solutions for disposing of clinical wastes.*

1 CERRIE Majority Report Introduction Para. 17

Minister comments on CERRIE

LibDem MP Norman Baker asked the Secretary of State for Health whether he would make changes to regulatory practice following CERRIE.

Miss Melanie Johnson replied: "I accept COMARE's view that: *In the field of radiological protection in general, the precautionary approach has been standard practice and models have been refined as new information has become available. I therefore do not consider that there needs to be a change in the Department's policies. Similarly, I consider that current regulatory practices, in particular the environmental regulatory framework regulated by the Department for Environment, Food and Rural Affairs, are sound.*"

9 Mar 2005 Hansard: Column 1915W *Radiation Risks*

Photo omitted from internet edition for technical reasons

Richard Bramhall, Secretary of the Low Level Radiation Campaign

Dose meaningless, old certainties unravel (concluded from page 1)

charged particle emissions, the extent to which current models adequately represent such interactions with biological targets, and the specification of target cells at risk. Indeed, the actual concepts of absorbed dose become questionable, and sometimes meaningless, when considering interactions at the cellular and molecular levels.

ICRP's Draft 2005 Recommendations provides a little more detail: ... *The absorbed dose distribution for radionuclides emitting alpha particles, soft beta particles, low-energy photons, and Auger electrons may be highly heterogeneous.*

Slogan

At a conference in March Richard Bramhall warned industry delegates, *The slogan "A Government Committee says dose is meaningless" certainly is easy to remember. Some stakeholders will argue that ECRR's methods allow historical dose assessments to be adjusted in light of new discoveries. He adds, People will laugh at comparisons between nuclear pollution and doses from eating brazil nuts or flying at altitude. Now we can see why the establishment is so desperate to deny any epidemiological evidence that shows their estimates are wrong.*

Stitch-up at leukaemia conference

Children with Leukaemia (CwL) is a big charity founded by Gortex millionaire Eddie O’Gorman and his wife after their son Paul died of leukaemia at the age of 14. In September 2004 CwL held a five-day international scientific conference in Church House, Westminster. It was the biggest such conference for ten years. Unusual among the cancer charities, CwL has a strong interest in looking for the causes of leukaemia, and the conference was intended to look at all the possible reasons for the long-term increase in the disease in children. At an early stage in the planning conference organiser Alasdair Philips asked Chris Busby to join the scientific steering committee and to be a speaker.

Later LLRC heard that Dr. Philips was facing political problems; other scientists were refusing to co-operate if Busby were involved but he was hopeful that Busby would be able to speak.

When the conference programme appeared, ionising radiation formed the agenda for the whole of day two. Half the speakers were members of CERRIE – Dudley Goodhead, Richard Wakeford (BNFL) John Harrison (NRPB) and Eric Wright. Goodhead and Bryn Bridges, chair of COMARE, were to chair the sessions. This was bound to present the establishment view.

Nevertheless, Alasdair Philips kept a slot open for the last day. The title was *European Committee on Radiation Risk and the ICRP*. Although the speaker was yet to be announced it was a natural topic for Busby, as Scientific Secretary of the ECRR. A week before the conference an amended agenda appeared; mobile phones had supplanted the ECRR. Busby phoned Dr. Philips, who explained. A few days previously he had phoned the Health Protection Agency to ask its Chairman, Sir William Stewart, about his invited Keynote Address. An official asked if Busby would be speaking. Philips was taken aback: *Well yes, he is due to speak on the Friday. Is that a problem?* The reply was: *No, of course not.*

Of course not?

In the next hour, out of the blue, Philips and Denis Henshaw at Bristol University, another member of the CwL committee, received emails from nine plenary speakers stating that if Busby were allowed to speak they would boycott the conference. Two members of the scientific committee said they would resign. Since the loss of so many speakers at the last

moment would destroy the conference, which had taken a year and £300,000 to organise, Philips had been forced to withdraw Busby’s invitation.

During the conference LLRC printed leaflets calling delegates’ attention to the suppression of scientific debate, but the conference organisers ran around picking them up. (Other material was stolen from LLRC’s poster site, too.) Later, in an intervention from the floor, Bramhall told conference delegates that Busby had been forced off the agenda. Many expressed their shock.

Not all was lost, because Professor Vyvyan Howard of Liverpool University was to give a presentation on the last day. He suggested that he should present some of Busby’s slides. Once he was on stage there would be little chance of silencing him. By the Friday Busby had had to go home but Professor Howard, discussing the inadequacy of present methods of assessing the relationship between industrial pollutants and the current cancer epidemic, illustrated his case with evidence of excess cancer risks caused by radioactivity. Dudley Goodhead, sitting in the audience, had seen all this before – in CERRIE meetings. He got up and stalked out.

Another gag

Blatant control was again exercised two months later. In November the Department of Health was to hold a stakeholder dialogue on Electro-Magnetic Fields. This was SAGE – *Stakeholder Advisory Group ElectroMagnetic Fields*.

Busby was invited to apply for a place but when he did so he was told he could not attend. LLRC’s Richard Bramhall was kept out too. The dialogue’s facilitator, Rob Angel, said he had been ordered to do this by the SAGE steering group, which consisted of Denis Henshaw (University of Bristol), Mike O’Carroll (University of Sunderland and REVOLT), Hilary Walker and George Hooker (Dept. of Health), and John Swanson (National Grid TRANSCO). Angel told *RaT* he would be asking the meeting to consider the range of stakeholders and whether the process should be made more open and inclusive.

RaT has now learnt that the meeting decided its remit is to advise Government Ministers on ElectroMagnetic Fields. It does not intend wider participation, though it has approached the Institute of Electrical Engineers and the Association of Manufacturers of Domestic Electrical Appliances.

(Concludes at foot of next page)

Freedom of Information?

Copies of emails obtained from the National Radiological Protection Board under the Freedom of Information Act reveal the names of some of the people involved in forcing Busby off the Children with Leukaemia conference agenda (see page 15). Messages marked *High priority* and *For your eyes only* implicate Dudley Goodhead and Bryn Bridges, Richard Wakeford of BNFL, and John Harrison, John Stather and Roger Cox of NRPB.

Information withheld

Chris Busby says *I asked the Medical Research Council for information too, but they haven't sent me the messages which must correspond to NRPB's. I also asked the University of Sussex, because Bryn Bridges' email address is part of the University system, but Hilary Walker of the Department of Health Radiation Unit says DoH is the data controller. The Sussex University data controller, Dr. John Gaunt, said he was sympathetic to my case, but he has suddenly taken early retirement. His replacement has yet to send me Bryn's end of the correspondence.*

Hinkley Point coastal cancer

New data confirm 21% excess

The sea-coast of Somerset is contaminated with radioactivity from Hinkley Point's reactors. Elevated leukaemia risks locally were identified in 1988 and continuing fears were confirmed in 2000 by a study which found excess adult cancer mortality in the seaside town of Burnham. A subsequent volunteer survey found excess incidence. COMARE attacked the survey and Dr Julia Verne, Director of the South West Cancer Intelligence Service (SWCIS), denied it on the basis of SWCIS data. LLRC showed that elevated risks near the sea were obvious in her data.

SWCIS has now issued new data covering the years 2000-2002 and claims it shows that Burnham-on-Sea has no statistically significant cancer excess. LLRC have pointed out that it is bad epidemiology to draw conclusions from only 3 years' data; long term analysis shows that cancer in the town is 21% higher than the national average. Dr. Verne was appointed to COMARE in 2004.

Electro-Magnetic gag continued

Richard Bramhall says *I asked Hilary Walker and Denis Henshaw to explain why I was excluded but they never replied, and have ignored my reminders. The group does include critics like Roger Coghill who can be relied on to give a robust view of the health risks but this is not Stakeholder Dialogue in the sense of openness and transparency the public has come to expect. It's a self-appointed advisory group dominated by industry and it's notably lacking in epidemiological expertise.*

DEFRA U-turn

Busby's application to the Department of Environment Food and Rural Affairs (DEFRA) produced only two emails. Busby protested that his ten years' of campaigning and the whole CERRIE process must have generated far more material. DEFRA replied that there was indeed more – so much of it, in fact, that copying it would cost more than their £600 limit. For this reason it would not be released.

Busby says: *These people are breaking the law by withholding data from me. I shall complain to the Information Commissioner.*

Lone dad loses out

The two DEFRA emails Busby has received were sent between Dudley Goodhead and CERRIE controller Ian Fairlie. They were discussing a request for Busby's committee expenses to include £30 to pay for a childminder at home in Aberystwyth while he was attending a CERRIE meeting in London. The request was refused.

Busby says he's joined *Fathers for Justice* but he'll stay with his own Superhero costume.



A warmer welcome at the Nobel Institute in Oslo. Busby with Edel Beukes of the Women's International League for Peace and Freedom

New Chernobyl effects confirm massive error in risk factors

Sweden – 30% adult cancer increase

A study published by the British Medical Association in November ⁽¹⁾ shows a 30% increase in adult cancers in northern Sweden after Chernobyl. The Swedish Radiation Protection Authority (SSI) poured doubt on the findings, reasoning that the cancers were too many and too soon to fit their models of radiation risk. *Most cancer cases don't develop until 20, 30 or 50 years after the exposure*, an SSI spokesman said. Chris Busby reminded *RaT* that the increase conforms with his prediction in *Wings of Death* ⁽²⁾. This was on the basis of cancer in the UK after weapons test fallout.

125-fold error ...

The extra cancers registered in 9 post-accident years 1988 to 1996 are at least 125 times the incidence predicted by ICRP on the basis of doses from Caesium in Sweden, which was measured and mapped in detail.

... or 600-fold ...

This implied 125-fold figure is a minimum, based on the assumption that the effect is transient and that there will be no excess after 1996. However, the lifetime follow-up of Hiroshima survivors shows a consistent upward trend and it is likely that the effect seen in Sweden is typical of the distribution of risks throughout life. Excess cancer rates will therefore probably continue. In this event the implied error in ICRP's modelling will be 600-fold.

... or more

The 600-fold error is a central estimate. The baseline for calculating the excess risks was the cancer rate in the least contaminated part of the study area during the year of the accident – 1986 – and the next. LLRC has noted that Chernobyl was followed by an immediate increase in cancer registrations in Wales, probably caused by radiation promoting existing pre-cancerous conditions. Using the two years after the accident as a control period underestimates risks. Richard Bramhall points out *Even SSI says the study should have used the years before the accident as the baseline. We hope this can be corrected – they must have the data somewhere.*

Belarus - 40% increase

In November 2004 *Swiss Medical Weekly* published findings ⁽³⁾ by workers at the Clinical Institute of Radiation Medicine and Endocrinology Research in Minsk, Belarus. It shows that between 1990 and 2000 total cancer incidence rates have risen by 40% compared with rates before the catastrophe. Belarus has had a national Cancer Registry as long as anywhere in Britain, keeping a computer data-base of all new cases of malignant tumours.

High statistical significance

All the results have high statistical significance. Increases in the various oblasts (regions) were:

- Brest 33%
- Vitebsk 38%
- Gomel 52%
- Grodno 44%
- Minsk 49%
- Mogilev 32%
- Minsk city 18%
- All Belarus 40%

Official predictions falsified

This contradicts the predictions of ICRP and the pronouncements of agencies such as the International Atomic Energy Agency and the World Health Organisation who claim that very little if any cancer has resulted or will result from the fallout. A United Nations committee reported in 2000 ⁽⁴⁾:

Apart from the substantial increase in thyroid cancer after childhood exposure observed in Belarus, the Russian Federation and Ukraine there is no evidence of a major public health impact related to ionising radiation 14 years after the Chernobyl accident. No increases in overall cancer incidence or mortality that could be associated with radiation exposure have been observed. [...] from the radiological point of view, based on the assessment of this Annex, generally positive prospects for the future health of most individuals should prevail.

LLRC's predictions confirmed

In 2001 Chris Busby reported ⁽⁵⁾ to the Belarus government that cancer would increase by 125% over the lifetimes of the exposed population. 40% of that increase is apparent only 14 years after the accident.

How to clean up land; who will decide?

There are twenty nuclear sites in the UK and the Ministry of Defence controls 590,000 acres of land, so the development of standards for dealing with chemical and radioactive contamination is important. For seven years a wide range of stakeholders has been working on Guidance for the industry and other stakeholders to use in deciding the fate of contaminated land. The project is managed by CIRIA – the Construction Industry Research and Information Association. LLRC got involved at an early stage to make sure that risks should not be underestimated.

Richard Bramhall sits on the project's Steering Group despite having doubts about the value of stakeholder dialogues. *Consultation fatigue is real, and many campaigners feel that the industry sucks them in, patronises them, wastes their time and energy and then does what it was going to do anyway. But CIRIA is setting new standards of good process and accommodating the concerns and practical problems of Non-Government Organisations. We are constantly refining the Safegrounds Guidance and the learning network which supports it. Over the next few decades it will be invaluable as a way for getting agreement between site operators, regulators, and the people who have to live with the consequences of pollution.*

Addressing a conference on the Guidance on March 10th Bramhall said that identifying and engaging with the public presented problems. *Very few people get involved until they are*

presented with a real issue, and in many cases they find out too late. This leads to anger and lack of trust. He cited the consultation on discharges from the Bradwell power station. The 8000 people who live on the island of West Mersea look across the Blackwater estuary and can see the power station two miles away, but it's 35 miles by road, in a different constituency and a different local authority. They didn't know there was a consultation until it had closed.

Grey power – *the right to say No*

Bramhall said: *Then one lady in her seventies found out that the plans included an incinerator for burning radioactively contaminated trash. She wrote out a leaflet and delivered a copy to every house on the island. The consultation had to start again.* Failure to consult can be expensive, he added. The recent campaign to stop Rolls-Royce dumping radioactive waste in the Derbyshire Peak District began after decades of secrecy. The anger of the local community manifested as blockades and adverse publicity. The campaigners estimate that establishing *We have the right to say No* cost Rolls-Royce £10 million.

Links

The Safegrounds Guidance is available online - www.safegrounds.com

Rolls-Royce dump campaign, see www.hiltsquarry.co.uk

Ask LLRC for a copy of Richard Bramhall's conference presentation – contact details are on back cover.



Margaret Smith leafleted the 8000-strong community of West Mersea, leading to the re-opening of an Environment Agency consultation, the scrapping of a planned incinerator, continuing opposition to the burning of contaminated oils, and a long-running dispute about local cancer rates between cancer registries, government committees, and local citizens.

References to new Chernobyl effects (from page 17)

1 Martin TONDEL, Peter Hjalmarsson, Lennart Hardell, Göran Carlsson and Olav Axelson *Journal of Epidemiology and Community Health* 2004;58:1011-1016 *Increase of regional total cancer incidence in north Sweden due to the Chernobyl accident?* (abstract at <http://jech.bmjournals.com/cgi/content/abstract/58/12/1011>)

2 *Wings of Death: Nuclear Pollution and Human Health* C.C. Busby Green Audit, Aberystwyth 1995 ISBN: 1-897761-03-1 (available from LLRC)

3 *A national cancer registry to assess trends after the Chernobyl accident* A. E. Okeanov, E. Y. Sosnovskaya, O. P. Priatkina; Clinical Institute of Radiation Medicine and Endocrinology Research, Minsk, Belarus *Swiss Medical Weekly* 2004;134:645–649 Issue 43/44, Nov 2004

4 UNSCEAR (2000) United Nations Scientific Committee on the Effects of Atomic Radiation. *Sources and Effects of Ionising Radiation 2000*. UN General Assembly, with Scientific Annexes. United Nations New York. [Quote is from Annex J Final]

5 *On Internal Irradiation and the Health Consequences of the Chernobyl Accident*; Chris Busby PhD. Presented at the Sixth Conference of the British and Irish Charity Organisations on Mitigating the Consequences in Belarus of the Chernobyl Catastrophe, London April 6th 2001. Occasional Paper 2001/5 Aberystwyth: Green Audit April 2001 (www.llrc.org/belarus.htm)

MENAI CHILD CANCER CLUSTER

In February 2004 HTV revealed its own research showing that leukaemia rates in children who live near the radioactively contaminated coast of north Wales are more than 20 times higher than the national average. Rates for a number of other cancers are also elevated. In Caernarfon babies and children younger than 4 are more than 20 times more likely to get leukaemia than the UK average. This is statistically significant and is echoed in the larger area around the town; in the 34 local authority wards surrounding the Menai there is 8-fold excess leukaemia, 5-fold excess of brain and spinal cancer, and 10-fold excess of the rare eye cancer retinoblastoma, which is linked to radiation.

In a March '04 briefing LLRC highlighted the parallel with the 1983 Yorkshire TV documentary, *Windscale – the Nuclear Laundry*, which blew the lid off the now notorious Seascale cluster. The Black Independent Advisory Group, reporting in 1984, called for new official watchdogs to monitor data on health and radioactive discharges. This led to the establishment of the UK's Committee on Medical Aspects of Radiation in the Environment (COMARE) and the Small Area Health Statistics Unit (SAHSU).

LLRC said *Twenty years later SAHSU and COMARE have found nothing - the job is still being done by campaigners and journalists.*

Watchdogs or wolves?

LLRC activists launched a letter-writing campaign. In response COMARE and the Department of Health strenuously denied that anybody has an overall watchdog role. COMARE's secretariat is based at the headquarters of the National Radiological Protection Board and it doesn't even have a budget. Health trends are monitored only by local organisations such as health authorities and primary care trusts, who can ask COMARE and SAHSU for advice if they want to. LLRC's Richard Bramhall is critical: *The dog's teeth were pulled out twenty years ago, he gets no food and he's forced to live with the wolves. The sheep have to call him if they notice a problem. No wonder we're losing lambs.*

Chris Busby says it's more sinister: *Faced with real evidence COMARE evades it. The Seascale cluster is put down to population mixing and COMARE's investigation of high cancer rates in Wales was a sick joke. When we submitted papers on the sharp increase of infant leukaemia after Chernobyl their Transgenerational Effects Committee thought it was merely "interesting", whereas it quite unequivocally falsifies the conventional risk model. It is COMARE's job to make reasoned assessments.*

Children denied

In August the National Public Health Service for Wales told the Liverpool *Daily Post* that its own *independently verified investigation* of the Menai Strait cluster showed *no trend for increased incidence of childhood leukaemia*. The other cancers were *not significantly different than what would be expected*.

The basis of the denial was a report from the Welsh Cancer Intelligence and Surveillance Unit (WCISU). LLRC asked for sight of it but was refused; contrary to what the *Daily Post* had been told, the report had only been internally reviewed and had to be checked independently. COMARE, WCISU and NPHSW have now dismissed the whole thing in reports published shortly

before *RaT* went to press.

Excess leukaemia confirmed

They accept that there is a statistically significant 12-fold risk of leukaemia (similar to Seascale). They claim it is due to chance. Excess risks for the other cancers are baldly denied. Hiding behind patient confidentiality the official reports give no data, so their assertions cannot be checked, except that LLRC knows where the sick children live (or lived), their names, ages, dates of diagnosis, and the conditions they suffered from.

There will be a fuller analysis in a future issue.

Parliamentary move to scrap COMARE and SAHSU

Last year LLRC's supporters called on MPs to sign Early Day Motion 1548. By the cut-off date in October it had gathered a respectable 85 signatures, including Ian Gibson, Chairman of the Commons' Science and Technology Committee.

The motion noted that COMARE and SAHSU had failed to fulfil the watchdog role called for by the 1984 Black report on child leukaemia near Sellafield. It proposed a new, balanced Committee with a full-time civil service secretariat and a budget sufficient to conduct its own research. A key demand is that the new Committee should not suffer from the disparity of resources which gave LLRC such problems on CERRIE.

**Get a DVD of the HTV documentary.
See back cover.**

Radioactive baby buggies?

Recycling nuclear junk is back on the European agenda

In 1997 and 1998 LLRC's high profile "Euratom Campaign" blocked a European attempt to ease the release and recycling of radioactively contaminated materials. Now, says Richard Bramhall, *Brussels seems set on making it mandatory, so we'll have to revive the campaign.*

The campaign was named after the 1957 Euratom Treaty which set up the European Atomic Energy Community. Since the treaty commits the EU to fostering nuclear power the European Commission is keen to remove one of the industry's biggest problems – its back-end dirt pile. In addition to high-level and intermediate radioactive wastes many millions of tons of less contaminated materials will arise during the next century as existing nuclear power stations come to the end of their lives and as bomb factories are dismantled. The big question is whether low-activity materials will be classified as clean and sold as scrap or as waste which has to be put in costly repositories. A wide range of commodities could be affected, including plasterboard, fertilisers, playground surfaces and road-building aggregates as well as metal goods.

Dog's breakfast

The 1996 Directive on radiation safety ⁽¹⁾ established the concept of *Clearance*, meaning the removal of materials from the control of nuclear regulators. However, it failed to win general acceptance, mainly because it is discretionary. Under the Directive Member States can allow or forbid

Clearance and can set their own thresholds for deciding what materials are too hot to release. They can also choose whether the end-use of Cleared materials should be monitored or not (Euro-speak for *conditional* and *unconditional* Clearance respectively). Since so much latitude is allowed, Clearance standards across Europe vary widely. Even Britain and France, the European Member States with the biggest nuclear industries, differ in their approaches. In Britain the word *Clearance* has never become part of the regulators' lexicon, but for some years a threshold of 0.4 Becquerels /gramme has been used to permit unconditional Clearance. By contrast France only allows conditional Clearance; materials must enter a known and monitored pathway. In Germany some categories of metals cannot be recycled. Some countries, notably those with no nuclear industry, have not adopted Clearance thresholds at all and in nuclear-free Ireland the law specifically excludes the concept of Clearance. On the other hand the Netherlands allows some types of radioactivity to be recycled at radioactivity concentrations 2,500,000 times higher than Britain's threshold value of 0.4 Bq/g.

Steptoes dig their heels in

A European Commission survey published in 2002 ⁽²⁾ reports that in many countries public opinion is against recycling radioactive scrap. The scrap metal industry also resists, partly because it tarnishes their public image, and partly because highly radioactive



A Welsh visit by lawyers representing survivors of the American A-bombs at Hiroshima and Nagasaki. They came to consult Chris Busby and Richard Bramhall over a legal action to force the Japanese government to broaden pension arrangements. Thousands of people are denied survivors' pensions because they were more than 2 kilometres from the exploding bombs. They nevertheless have a range of diseases and blame the radiation. Team leader Masayoshi Naito (second right) was himself born to parents from Hiroshima who had lost several children before he was born.

sources have been known to find their way into scrap-yards, either accidentally or as a result of criminal acts including smuggling. If the sources aren't spotted before they go into the smelter the consequences are dangerous and very costly. Such incidents have happened, releasing clouds of Cobalt 60 and Caesium 137 and triggering radiation alarms hundreds of miles away. Scrap-yard entrances now have monitors, and lorry-loads which set them off may be turned away.

International confusion thus threatens to turn contaminated scrap from a potential money-maker into a costly embarrassment.

Scrapping trade barriers; educating the public

The International Atomic Energy Agency – a UN agency which like Euratom is unequivocally pro-nuclear – is keen to remove the obstacles to Clearance. In August 2004 the IAEA published a Safety Guide⁽³⁾ which recommends that Governments should harmonise Clearance criteria to avoid hindering trade. Europe seems likely to follow this lead. The Commission's survey⁽²⁾ puts a strong and repeated emphasis on the importance of Member States harmonising thresholds and using common sources of advice (the Commission favours its own advice, it turns out – see *European Loop*, page 10). Another recommendation is that industries which might come into contact with Cleared materials should be educated so that they accept the idea.

No limits

As if anyone could doubt that the Clearance juggernaut is driven by economic imperatives, the Commission is anxious not to restrict the quantities. In the 1990s, when the Commission's advisers were working out Clearance criteria they thought there ought to be limits on the amounts of material involved and hence on the numbers of radioactive atoms and particles that could enter the environment. These *mass limits* were typically of the order of a few tons at most, but Commission documents now make it plain that only the concentrations of radioactivity matter, not the total amounts. Worldwide decommissioning in the

next few decades will generate some 30 million tons of metals alone, leading to contamination of smelter slag and dusts which have many industrial uses. Concrete, oils, soil and general trash are in addition.

Radioactive recycling; the next moves

LLRC predicts that once the new Article 31 Group has been appointed the European Commission will soon propose amending the 1996 Directive to kick Member States into line over Clearance. The European Parliament will be consulted, but it has no power of decision over a Euratom Directive and history shows that most of what MEPs say will be ignored. We will be sending out campaign materials.

CoRWM warning

LLRC has warned Britain's Committee on Radioactive Waste Management (CoRWM) that they are seriously underestimating the volumes of material that may end up having to be designated as waste. CoRWM thinks contaminated recyclable materials aren't part of its remit, but what if the scrap industry refuses to accept them?

The same debate is happening in Japan and the US. See the Public Citizen site http://www.citizen.org/cmep/energy_enviro_nuclear/nuclear_waste/low-level/recycling/

References

- 1 Council Directive 96/29/EURATOM of 13th May 1996 Official Journal L159 Vol. 39 29 June 1996
- 2 *Radiation Protection 134: Evaluation of the application of the concepts of exemption and clearance for practices according to title III of Council Directive 96/29/Euratom of 13 May 1996 in EU Member States* 2 volumes. European Commission, Directorate-General for Energy and Transport Directorate H – Nuclear Safety and Safeguards Unit H.4 – Radiation Protection
- 3 Safety Standards Series Safety Guide No. RS-G-1.7 *Application of the Concepts of Exclusion, Exemption and Clearance* International Atomic Energy Agency Vienna.

References from page 11 – *Infant leukaemia after Chernobyl*

- 1 J. RADIOL. PROT. 24 (2004) 119-122 (Barrie Lambert Review of CERRIE Majority Report)
- 2 BRADFORD HILL (1965) *The Environment and Disease: Association or Causation?* Proceedings of Royal Society of Medicine, 58, 295–300

Menai cluster – sites to check for official responses:

COMARE – www.comare.org.uk
 Cancer Registry – www.wcisuwales.nhs.uk
 National Public Health Service, Wales – <http://www.wales.nhs.uk/sites/page.cfm?orgid=368&pid=4017> (use this URL – the NHS site is hard to navigate)

Nuclear cover ups – the DVD



**DVD cover girl,
Gemma D'Arcy.**
Gemma lived near Sellafield
and died of leukaemia in
1990, aged six

With support from the Marmot Trust we have produced a DVD containing three films about nuclear cover-ups. We thank the makers of the films for permission to use them. They are:

Nuclear cover ups Producer Chris Busby; LLRC 2005 followed by

Cancers plant (*Cancer in children*). Producer Tweli Griffiths, HTV Wales; 2004. In Welsh with subtitles. This is the HTV documentary which revealed the high rate of cancer and leukaemia in children on the Menai Strait in north Wales (see page 19 of this issue).

Nuclear Controversies Producer Wladimir Tcherkoff, Feldat Film (Switzerland) 2004. This was filmed at an international conference in Kiev of the World Health Organisation and the Association of Physicians of Chernobyl. It captures a conspiracy to alter conference decisions the IAEA didn't like.

Copies of the DVD are available, price £2.00. This is less than the cost of producing and sending them. To order your copy please use the form below.

Tick this box to be on our mailing list to receive *Radioactive Times*
please send £10 (individuals) or £15 (groups) Have we got your address?

Tick this box to order copies of the *Nuclear Cover-ups* DVD at £2.00 each

Are you making a donation?

 £

Please make cheques payable to Low Level Radiation Campaign.

If you want to set up a standing order to support the LLRC's work, the bank account details are:
HSBC, Llandrindod Wells Branch, Middleton Street, Llandrindod Wells LD1 5EU
Sort code: 40 30 05; Account name: Low Level Radiation Campaign
Account number: 51384007 IBAN: GB48MIDL 40 30 05 51384007

Your name

Address email

..... Post code

We do not share your contact details with anyone else

LLRC, The Knoll, Montpellier Park, Llandrindod Wells LD1 5LW

Email: bramhall@llrc.org Web: www.llrc.org

The Low Level Radiation Campaign is a Company Limited by Guarantee
Company number 3821690
Registered Office 20 Market Street, Builth Wells, Powys LD2 3EA U.K.