

---

---

# Radioactive Times

---

---

Volume 6 Issue

The Journal of the Low Level Radiation Campaign

January 2007

---

---

## ISRAEL USED ENRICHED URANIUM IN LEBANON

### High Tech Fireworks

As everyone now knows, this Summer Israel invaded southern Lebanon deploying huge amounts of novel weaponry. The US military emergency stockpiles held by Israel were estimated by Russia at 4.5 Billion dollars worth. This enormously expensive fireworks display failed to defeat the Hizbollah enemy but nevertheless caused the deaths and injury of many thousands of innocent civilians. There is significant concern over the types of weapons employed and whether Israel can be accused of war crimes; the Israeli Defence Force (IDF) have now admitted deploying phosphorus weapons - although at first they denied this. But what they continue to deny is that they employed weapons containing Uranium. As RaT readers are aware, Uranium weapons, originally termed Depleted Uranium (DU) Weapons, have become a major feature of modern advanced warfare. Following the Afghan conflict and the 2003 Iraq war, LLRC and others have been pointing to evidence that suggests that DU or Uranium has been used in large quantities as penetrators in Cruise Missiles and large bunker busting guided bombs. However, no-one has got near enough to the war zones, sufficiently soon after the war, to collect samples that might show that this were so. And, of course, the military deny such use.

### Technical advances

For the military, DU was the magic bullet. It destroyed tanks and armour with embarrassing ease; it got rid of nuclear waste. The fact that it produces an aerosol of micron-sized radioactive dust that disperses and persists in the environment and causes cancer in civilians is, of course, the down-side, as this might lead to litigation and bad press. But when DU was first used, it was hard to detect: because to find the contamination you needed to measure tiny amounts of the two isotopes U-235 and U-238. And the ratio in nature was 137.88, so the quantities of U-235 that you had to measure were tiny - less than a fraction of a nanogram, close to some trillionths of a gram. But by the end of the 1990s this was becoming possible through new instruments called ICPMS spectrometers. By the time of the Afghan conflict and the 2003 Iraq war, the need to penetrate armour and kill people in deep bunkers had become paramount, and so DU needed to be



*The crater in Kham from which Dai Williams took a soil sample which showed the presence of enriched uranium-Crater in Southern Lebanon caused by Israeli Missile of guided bomb. Soil Samples were brought back by Dai Williams and tested by Green Audit and then sent to the Harwell and to Bangor University for further tests.*

deployed in large quantities as penetrators in bunker-busting missiles and bombs. Dai Williams, who has spent a lot of time researching DU weapons, has found many Patents for such weapons employing DU. How to use these weapons and avoid the fuss that occurred after the first Gulf War, the Balkans, Gulf War syndrome, Iraqi children with leukaemia and so forth? Well, the answer is obvious: use natural uranium. It is not so very expensive, and represents a very small fraction of the cost of a Cruise missile. It also represents a small fraction of the cost of child leukaemia litigation, Gulf War syndrome litigation or being taken to Nuremberg. Measurements of urine or blood in victims after any war will just show a normal uranium signature but will show high levels of uranium. This is what was found, by Asaf Durakovic, in urine measurements of hospital patients in Afghanistan. In the UK Gulf War 2 troops, again, uranium levels were high, but it was natural uranium. But no one has gone in and found a uranium signature in material from a bomb crater in Afghanistan or Iraq, since the US will not allow anyone near and, indeed, after the 2003 conflict, would not even

let the International Atomic Energy Agency in with their instruments. Very suspicious. This brings us to Lebanon and some real scientific evidence.

### Uranium in Lebanon

The first evidence that the IDF were using uranium was a picture from the Getty picture library that showed a uranium shell being carried by a soldier. Shortly after the war stopped on 17th of August, a report in the Lebanese 'Daily Star' newspaper drew attention to some radiation readings made by a Lebanese scientist in a bomb crater in Khiam in South Lebanon. The scientist, Dr Khobeisi, measured a gamma exposure reading of 700nSv/h in the crater and 300nSv/h at the edge; the background for the area was 30nSv/h. Something was there: but what? Dai Williams, an independent researcher from Surrey, went to Lebanon on 17th of September on behalf of Green Audit to find out and bring back samples from the Khiam crater and other sites. The soil samples were examined in Aberystwyth using a beta scintillation counter and also alpha registering CR39 plastic (see story in this issue). It was clear that the Khiam sample was more radioactive than background soil samples from the area. Dai Williams also brought back a vehicle air filter from an ambulance. Now to analyse samples for Uranium isotopes is a very costly business, however, Dai Williams decided to pay for some tests out of his own savings and two soil samples and the filter were sent to the Harwell labs in Oxfordshire. The results were astonishing. They confirmed the presence of a radioactive material, but the material was enriched Uranium with an isotopic ratio of 108. This was in the soil sample from Khiam and also in the ambulance filter. The Khiam soil sample also contained quite a lot of Uranium - about 180Bq/kg (normal soil in the area would have less than 20Bq/kg). Green Audit published a preliminary report and sent the soil sample to the School of Ocean Sciences in Bangor, North Wales for testing using a different technique. The tests from Bangor showed that the sample did contain enriched uranium. It also showed that there were no fission-product isotopes like Cs-137 and no plutonium. The Robert Fisk story appeared on the front page and two inside pages of *The Independent* on 28th of October. The IDF denied using Uranium. The Lebanese authorities stated that they had no evidence of the use of Uranium but that the UNEP post-conflict team had been making a survey and would report in November.

### Puzzling results

The question is, why use enriched Uranium? It is a bit like shooting your enemy with diamonds. There were only two possible explanations. The first is that it is a smokescreen for a more widespread use of depleted Uranium; the final contamination when all gets mixed up after the war has a natural isotopic signature. The second idea is that this is some new type of weapon altogether,



*This picture, found on the internet, shows an IDF soldier in Lebanon carrying a DU anti-tank shell. Notice the pointed Uranium rod and the plastic 'sabot'*

one that needs enriched Uranium to work. One Italian physicist has suggested a fusion bomb using deuterium and enriched uranium to produce neutrons which kill living systems but do not destroy property. Others have suggested a thermobaric device in which the uranium powder has to have particular burn properties, conferred by the radioactivity of the enrichment.

Whatever the explanation, the airbrush came rapidly out. The following week Steve Connor, the science writer for the Independent, wrote a small dismissive article in which Chris Busby was demoted from Scientific Secretary of the European Committee on Radiation Risk to a Green Party Activist and the existence of Uranium in Lebanon was denied. Of course, this is a political issue. The war stopped because the UN peace keepers were to go in and police southern Lebanon. If there was Uranium there, then the UN troops would be rather unhappy about serving, since they had already been stung in Kosovo where Spanish, Italian and Portuguese troops had suffered leukaemia and lymphoma from DU exposures. Sensing a cover-up involving UNEP and Lebanese authorities, Dai Williams decided to go back and get more samples. He went back to Lebanon on 18th November and brought back several samples of soil and water from Khiam and other sites. These were examined by Chris Busby in Aberystwyth and the ones with increased radiation signatures sent to Harwell. Results showed the presence of enriched Uranium in the water samples from two separate craters in Khiam and showed a significant amount of Uranium in one of the soil samples. At this point the analysis had to stop since everyone had run out of money. The total cost of analysing all these samples was around £2000. LLRC stumped up some of the money, an Arab friend found £400, some Swiss friends sent £450 and Dai is left having to pay for the rest. However,

what we have shown (see table) is that the IDF used enriched uranium in Lebanon. And since it is in the ambulance air filter, it is also in the lungs of the inhabitants, and so we must expect the usual cancers/ leukaemias/ birth defects that were found in Iraq. It is outrageous, though not surprising, that UNEP have been so useless, incompetent and biased (see story). The Lebanese people have been sacrificed (just as other civilian populations in Kosovo, in Iraq, in Afghanistan, have been sacrificed) to the need to employ Uranium weapons. And it may be worse: we still do not know what the weapon was. It is of some interest to us that the radioactivity in the crater was high at the beginning, but fell off rapidly with time. This may suggest the presence of short-lived isotopes. More analytical work is needed, but this costs money and no one will pay because those with money -the authorities- don't want to know.



date	sample	method	U238	U235	atom ratio	comment
16/09	soil Khiam	ICPMS	13mg/kg	0.12mg/kg	108	enriched
16/09	soil Khiam	alpha spec	146Bq/kg	8.1Bq/kg	117	enriched
16/09	airfilter	ICPMS	0.12mg/kg	0.0010mg/kg	113	enriched
20/10	water Khiam	ICPMS	6.4ug/l	0.06ug/l	109	enriched
20/10	water Khiam	ICPMS	4.0ug/l	0.04ug/l	1102	enriched

*Above: Some results of analysis of soil, water and filter samples from Lebanon showing existence of enriched Uranium. The water samples were from water that had collected in two different craters, either side of a road. Natural uranium isotope ratio is 137.88 and remains within 2 units of this.*



*Top right: This ambulance, parked in S Beirut at Heret Hreyk, was immobilised on the second week of the war. The air filter contained enriched Uranium.*

*Left: Crater in southern Lebanon was caused by Israeli guided missile . Soil samples were brought back by Dai Williams, tested by Green Audit and then sent to the Harwell and to Bangor University for further tests.*

## PHOTOELECTRON ENHANCEMENT OF DOSE

### URANIUM ANOMALIES

In the beginning there was the Gulf War syndrome. Troops exposed to Depleted Uranium developed illnesses similar to those shown by people exposed to radiation after Chernobyl and after Hiroshima. There were increases in cancer, leukaemia in children and heritable defects in Iraq. The radiation risk agencies, employing the conventional models, argued that the doses were too low. Others argued that the concept of 'dose' (energy per unit mass) was not applicable to particles of Uranium Oxide. The Royal Society was brought in: their committee endorsed the idea that levels of Uranium were too low for any effect to be causal. The UK Ministry of Defence set up the Depleted Uranium Oversight Board to investigate how much Uranium was in the GW1 troops. Chris Busby and Malcolm Hooper were scientists on the DUOB representing the vets. The study has been done: we will report the results in the next issue. But the DUOB also looked at the science: What emerged over the last 5 years was an extraordinary amount of evidence that Uranium seemed to be somehow able to cause radiological health effects quite out of proportion to its radioactivity.

### Chromosomes and genomics

First there were chromosome aberrations in GW1 veterans. Centric rings and Dicentric chromosomes are caused by radiation and can be used to calculate historic exposure. The vets that were tested in Bremen had significant chromosome aberrations, sufficient by analogy with aberrations in Chernobyl firemen (who had exposures measured by film badges), to correlate with doses of 150mSv or more in the two years prior to the vets' tests in

1999. Yet how could this be? Uranium is a very weakly radioactive substance.

Then there were cell culture results from the USA. Alexandra Miller and her team in the USA showed in a series of publications that Uranium caused genomic instability in cell cultures at levels that were far too low for the effects to be due to the intrinsic radioactivity of the amounts of uranium used. This led many to talk about the chemical mutagenicity of Uranium. The explanation for the anomalies may lie in a new theory which was advanced by Chris Busby in 2003, and presented to the CER-RIE committee: the secondary photoelectron enhancement or SPE theory. The consequences of this idea, if it is found to be correct by experiment, are wide ranging, and they certainly include the end of Uranium weapon usage and the end of the idea that Uranium is somehow safe.

### Photoelectrons

There are two strands to the theory, as it applies to Uranium effects. The first is that Uranium chemically binds strongly to DNA. This has been known since Uranium began to be the stain of choice for electron microscopy in the 1960s. The affinity constant for DNA (a measure of the strength of binding) was measured in the 1990s. It is  $5 \times 10^{11}$ , which means that at this concentration of Uranium (a few nanograms per litre) half of the Uranium is on the DNA. The second strand is that Uranium absorbs gamma rays some 100,000 times more efficiently than normal tissue atoms (carbon, oxygen, hydrogen, sulphur and phosphorus). This is because all elements absorb gamma rays proportionately to the fourth power of the atomic number (the number of electrons in the atom). And when the Uranium absorbs the gamma rays from natural background radiation, each

atom (or particle) re-emits the energy as photoelectrons. It is the photoelectrons (which are indistinguishable from beta particles) that do the damage to tissue and cause the free radicals and other ions that destroy or alter the DNA. So, according to SPE theory, it is the amplification of natural background by the Uranium, in the form of local photoelectrons in the DNA (since the Uranium is stuck on the DNA), that causes the anomalous biological effects. Since the Uranium is continually doing this, so long as it remains on the DNA it can also cause second event effects. Uranium stays in the body for a long time. The half-life of the slow dissolving Uranium is about 15 years.

### Heavy metals

Of course, this effect is due to the atomic number of Uranium. It will also happen with any high atomic number element, like lead, gold or platinum, so long as the element binds to DNA. It is interesting and may support the theory, that platinum complexes have been made that bind to DNA (e.g. *cisplatin*) and have powerful mutagenic properties, used for cancer treatment.

### Experiments

The idea is amenable to experiment. All that is needed is to measure the absorption by gamma rays of a solution of a soluble Uranium, lead or gold (or any other high atomic number element) salt and examine re-emission of the photoelectrons. We vary the metal concentration and the incident gamma radiation intensity and count the photoelectrons emitted. For this we need a scintillation counter, a gamma source, some chemicals and some time and support to do the work. The SPE theory may also have implications for heavy metal poisoning, the carcinogenicity of metals, even catalysis. In any event, if

this idea is correct, it will be the end of DU use in war, and probably the end of the nuclear project also, since that depends on Uranium and Uranium is the largest polluter near nuclear sites. Its interesting that we are all worried about the hot isotopes, Plutonium, Caesium, Strontium and so forth (and not without reason), but actually Uranium, because it is so weakly radioactive intrinsically and because it is a 'natural substance', can exist in enormous amounts near nuclear sites and be ignored and not even measured. In fact, the final COMARE report on the Sellafield child leukaemias exonerated the plant on the basis that most of the children's exposures were from natural isotopes like Uranium. The implications for health are scary: the matter was published in the recent PINCHE report conclusions. The Department of Health has recently announced that it has money to fund research into mechanisms of internal radiation action. Green Audit intends to apply for some of this money. Do you think the application will be successful?

*Chris Busby's two EBAB papers below are available from LLRC.*

#### Refs:

Busby C and Fucic A (2006) Ionizing Radiation and children's health: PINCHE conclusions *Acta Paediatrica* 95 Suppl. 453 81-85`

Busby CC (2005) Does Uranium contamination amplify natural background radiation dose to the DNA? *European J. Biology and Bioelectromagnetics*. 1 (2) Ch 2

Busby CC (2005) Depleted Uranium Weapons, metal particles and radiation dose. *European J. Biology and Bioelectromagnetics*. 1(1) Ch 7.

Miller AC, Xu J, Stewart M, Brooks K, Hodge S, Shi L, Page N, McLain D (2002) Observation of radiation specific damage in human cells exposed to depleted Uranium: dicentric frequency and neoplastic transformation as endpoints. *Radiation Protection Dosimetry* 99 (14) 275-8

Miller AC, Stewart M, Brooks K, Shi

L, Page N (2002) Depleted Uranium catalysed oxidative DNA damage: absence of significant alpha particle decay. *Journal of inorganic biochemistry* 91 (1) 246-52

Schroeder H, Heimers A, Frentzel Beyme R, Schott A and Hoffmann W (2003) 'Chromosome aberration analysis in peripheral lymphocytes of Gulf War and Balkans War veterans'. *Rad. Prot. Dosim* 103 (3) 211-219

WHAT DOES IT MEAN? We are all subje

je ct to natural background gamma radiation. If you shine X-rays on a person, or a gamma ray, most of the radiation passes right through. When you look at an X-ray photograph, you see bones. You see the skeleton because the bones stop more of the X-ray energy. Metals (e.g. a safety pin) stop much more X-ray energy: they block it out altogether. This means that they absorb it and so cast a shadow, just like a tree casts a shadow of the sun.

The reason why bodies are relatively transparent is that the atoms of bodies have a low atomic number. Hydrogen 1, carbon 6, oxygen 8, indeed all are lower than 20; the highest, Iron in the blood, is 26. Bones can be seen because Calcium is 20. Radiologists wear a lead apron because Lead stops (i.e. absorbs) X-radiation (atomic number 82). Uranium is better, its atomic number is 92. But the radiation that is absorbed by the lead apron is turned into photoelectrons (which can't affect the wearer as they are also stopped by the lead. But if the lead (or Uranium) were in the form of tiny enough particles, or even atoms, inside the body, the absorbed radiation would be almost entirely available as fast photoelectrons and the absorbed dose would be transferred to the local tissue. If the atom was stuck on the DNA, then this would be into the DNA itself, and this is the problem. Annual Natural Background gamma dose of 1mSv would be turned into about 80,000mSv near the position of the Uranium atom.

## RADIOACTIVE BALTIC

The Swedish Environment Movement's Nuclear Waste Secretariat (MILKAS) has just presented the proceedings of this year's Baltic Sea NGP forum, sponsored by the Swedish Foreign Ministry.

MILKAS was put in charge of co-ordinating an important workshop on the theme of the environment. Focus was directed on the fact that the Baltic Sea is one of the most radioactive waters in the world, due to the fact that, like the Irish Sea, it is essentially contained, and receives radioactivity from Swedish, Finnish and Russian nuclear plants, as well as the outflow of rivers carrying radioactivity from the Chernobyl fallout. At the meeting were two regional inter-governmental institutions with members working on the radioactivity of the Baltic Sea, HELCOMMORS (Helsinki Commission) and WGRNS (Council; of the Baltic Sea States). These expert groups have concluded that *levels of anthropogenic radionuclides are higher in the Baltic Sea than in any other water bodies around the world*. In addition, real satellite pictures show the thermal heat pollution from Swedish and Russian nuclear reactors which cause algal blooms and kill fish. According to the most thorough investigation ever financed by the EU, Swedish reactors continue to be the worst polluters, releasing more than 100,000 times more radioactivity than the Russian reactors at Susnovy Bor! LLRC expects the same cancer effects that have been found in the Welsh and Irish Sea coasts by Green Audit. [*Story Per Hegelund*]

# ECRR ~ CHERNOBYL: 20 YEARS ON

## -New ECRR Publication-

Published in May 2006, this new book, edited and produced by The European Committee on Radiation Risk, presents the true consequences of the Chernobyl accident.

Eminent scientists (including many from the Russian Academy of Sciences) examine and review the data and show that, rather than fading away, the effects are only beginning to show themselves. The phenomenon of 'genomic instability', discovered in the laboratory in the UK in the 1990s, is seen now in its terrible effects on the animals, plants and human victims of the Chernobyl exposures. It is seen at doses that would have been, and still are, dismissed as vanishingly small by the current radiation protection laws.

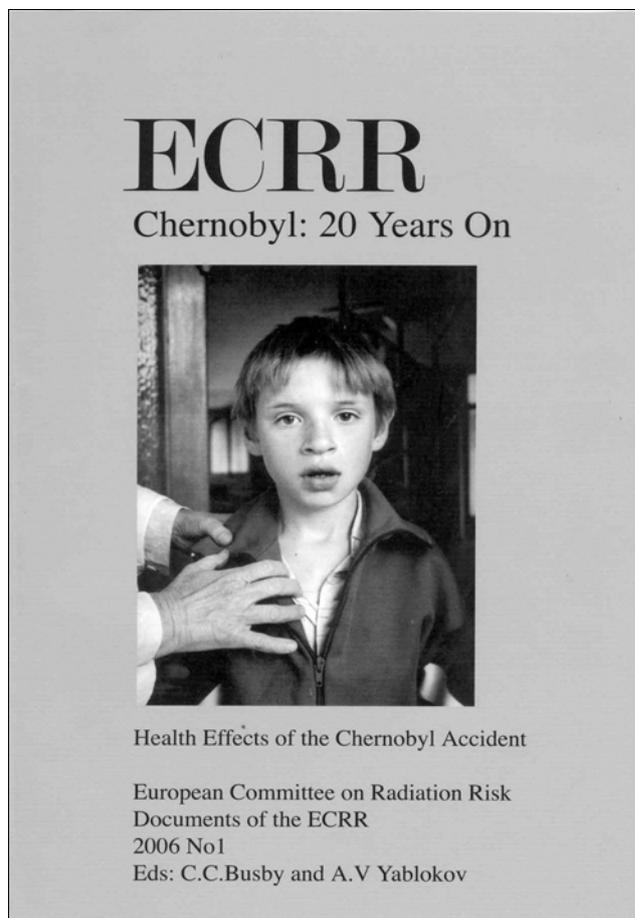
Research into these effects has been mainly published in Russian language journals; these valuable contributions have (perhaps purposely) rarely been translated into English. To do so would have been fatal to the nuclear industry which routinely discharges the same radioactive substances into the environment under license.

"In 20 years it has become clear that not tens, hundreds or thousands, but millions of people in the Northern hemisphere have suffered and will suffer from the Chernobyl catastrophe...

...Official secrecy (until May 23rd, 1989) and irreversible state falsification of medical data during the first three years after the catastrophe, as well as an absence of authentic medical statistics in the former USSR, highlights the inadequacy of material concerning primary epidemiological consequences of this catastrophe..." - *A.V. Yablokov, Russian Academy of Sciences, and Center for Russian Ecological Policy, Moscow.*

"The detected cytogenetic effects of chronic low-intensive irradiation in the germ and somatic cells of wild animals exceeded the expected levels deduced from extrapolation of the data from the high-dose range of acute or chronic irradiation. In wild murine rodents increased frequencies of cytogenetic injuries in somatic and germ cells, as well as embryonal lethality, were shown to remain over the life spans of no less than 22 generations (Goncharova & Ryabokon, 1998)... -*E. Yu. Krysanov, Institute of Ecology and Evolution, Russian Academy of Sciences*

Here are data from the real world: the world of the



Chernobyl laboratory. The lessons contained in these chapters should be borne in mind by policy makers who are, even now, discussing new investments in nuclear energy and ways in which historic and future radionuclide waste can be disposed of into the environment. The committee recommends this book to scientists, policymakers and concerned members of the public, in the hope that the huge amount of work carried out by scientists publishing their results in Russian language journals and others studying the effects of the Chernobyl accident will influence their decisions in this important area of public health

**Chernobyl: 20 Years On** is now available on the ECRR website: [www.euradcom.org](http://www.euradcom.org). There are still a few copies of the book left that may be ordered on the above website, but stocks are extremely low. The ECRR are currently seeking funding for another print run of this popular and informative publication.

## DAD IS DEAD

**D.A.D. (decide, announce, defend) is dead, but U.N.C.L.E. (unlimited nuclear consultations leading to exhaustion) lives on**

Currently, in both the UK and across Europe, there is a clear move towards the integration of community participation in environmental and health risk debates. This move is driven by a perceived need for a more deliberative, accountable, transparent, and publicly acceptable way to make decisions concerning potential health risks, and implement change in order to improve the quality of the environment. The idea is that, by broadening and extending the range of stakeholders directly involved in an environmental risk decision-making process, the likelihood of resolving the problem in the long-term is increased. This is achieved through forging a more durable consensus between the public and policy-makers by integrating the knowledge and views of both scientific experts and communities subject to environmental risk. Although this process evolves at its own pace, it is thought that this consensus emerges because all relevant stakeholders trust that their views and experience are taken into consideration. Well that's the theory - however the practice is very different. Take the example of radiation risk. There's been a raft of public consultation about radiation risk, including those on:

- How to deal with UK's nuclear waste problem - CoRWM (Committee on Radioactive Waste Management).
- How to power our society - the 'Energy Review'.
- What to do about the vast nuclear decommissioning legacy – via the Nuclear Decommissioning Authority (NDA) National Stakeholder Group (NSG).
- Whether we should change the planning laws to enable nuclear new-build by limiting the right of public enquiry – the 'Policy Framework for New Nuclear Build'. The next rounds of consultation will be based around the 'Strategic Siting of New Nuclear build', based on what is known as a 'Statement of Need', in the context of 'Justification'.

All of these consultations take time, knowledge, energy and expertise to engage with. All of these consultations either have or will, inevitably, conclude in a similar fashion. No matter how many reasoned objections to rebuilding the nuclear project in the UK, the results of all of these consultation have been, and will be, a big thumbs-up for increasing the operating capacity of the nuclear industry and adding to a growing rad-waste burden whose legacy will outlive our society.

Since nuclear waste is a hotly contested area, and will need

## CARRY ON CORWM

public consent to site waste storage facilities, CoRWM said that they would take its consultation process very seriously. However, a broad range of stakeholders with experience of other stakeholder exercises, such as the Magnox Decommissioning Dialogue, public inquiries at Hinkley Point and Trawsfynydd found it to be a largely biased process, open to manipulation by the nuclear industry, a fraction (30-50%) of stakeholders at public consultation events were from the nuclear industry - managers in general hostile to alternative NGO views. They found that the particular appraisal processes used by CoRWM to assess the risks of nuclear waste management had already been strongly criticised at public inquiries (Nirex; Trawsfynydd). They reported that the information presented at the public consultation exercises was selected, edited and limited - quite insufficient to base stakeholder decisions upon. They protested that the government's choice of NNC to run the process was a clear mistake due to their longstanding nuclear industry pedigree and involvement.

Once AMEC (with their overt agenda for new-build nuclear power) took NNC over, the position of NNC as programme managers for CoRWM became untenable under conflict of interest criteria. Stakeholders pointed to the restricted scientific and technical assumptions for the deep-disposal dump, such as heat generation, long term chemistry, long term microbiology and the consequences of groundwater contamination from leaks under fault conditions. Because of this they concluded that 'a fundamentally flawed process has resulted'.

However, none of this mattered to CoRWM, who responded with a short, dismissive note. In the end, the Committee concluded that a deep dump was a good idea.



*Minister prepares to meet stake-holders*

### The Energy Review Consultation

The consultation period for the Energy Review, whose findings could have one of the most significant impacts on the way we order our society, was a few months. The Review and the consultation that followed were widely criticised. A broad range of pollution control, renewable energy and health protection environmental groups dissected the Review and all agreed that its key findings were flawed - but, as usual, their views were rejected.

After the end of the consultation process, Greenpeace filed a legal challenge stating that the 'consultation' was short, badly run, legally flawed and breached HMG's own standards. This view was echoed by some big policy hitters, including the Environment Agency and a House of Commons Select Committee. The chairman of the Trade and Industry Committee noted that the Energy Review was "a rubber-stamping exercise for a decision the Prime Minister took some time ago". The Sustainable Development Commission concluded that the Review "offers no information whatsoever on what any new nuclear programme might look like and people are being asked to comment on the potential contribution of a new nuclear programme without any of the key aspects (regarding reactor design, cost, waste management, liability issues, and so on) having been addressed". The House of Commons Trade and Industry Committee were concerned "about the manner in which this Energy Review has been conducted. Throughout the process, the Government has hinted strongly that it has already made its mind up on nuclear power". The House of Commons Environmental Audit Committee said: "The nature of the current Energy Review is unclear-whether it is specifically

*fulfilling the Prime Minister's desire to make a decision on nuclear, whether it is a review of electricity generating policy, whether it is a wider review of progress against the Energy White Paper, or whether it is reopening the broad policy debate which the White Paper itself encompassed. We are also concerned that it does not appear to have resulted from a due process of monitoring and accountability, and that the process by which it is being conducted appears far less structured and transparent than the process by which the White Paper itself was reached".*



*Prof Gordon MacKerron  
Chair of CoRWM*

### LLRC FILM UNIT

The *Nuclear Cover Ups* DVD which was made by Green Audit for LLRC last year was a campaigning development which was very successful. It was shown at conferences and meetings all over the country at the time of the Chernobyl anniversary. In addition, copies of the DVD were posted to all MPs, Welsh Assembly and to Scottish AMs. It has been such a successful campaigning tool that Green Audit has purchased a professional Video Camera, a Canon XL1S and will be making a short film about the Trawsfynydd cancer cluster, discovered in 2006 through a collaboration with the Welsh TV company S4C. The S4C documentary will also be packaged with the LLRC film on a DVD and used as a campaigning tool. We expect to have this completed by Spring 2007. The first documentary was made using a PC computer but what is really needed is a Macintosh computer and *Final Cut* software for video editing. Donations (system or funds to purchase) welcome!

### *NUCLEAR COVER-UPS*

Copies of the March 2005 LLRC DVD may still be obtained by sending a cheque for £5, incl. postage and packing to Green Audit at Castle Cottage, Sea View Place, Aberystwyth ST23 1DZ

DVD contains :

#### \* **Nuclear Cover-ups**

A short introduction to the effects of Sellafield on the coastal communities of the Irish Sea

produced by C Busby

\* **Cancers Plant** (Cancer in Children in north Wales) HTV Documentary 2004 reporting the cancer in children living near the sellafield contamination in North Wales. Welsh with English Subtitles  
produced by Tweli Griffiths

\* **Nuclear Controversies** Swiss documentary about cover-ups by the WHO and IAEA at the Chernobyl Conference in Kiev 2001. Russian and French with English Subtitles. Absolutely not to be missed. We see the cover-up captured on camera.  
Produced by W. Tcherkoff.

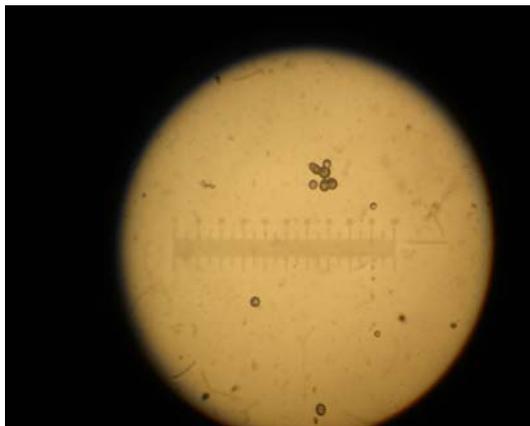
---

## URANIUM DETECTOR

---

Because Uranium is an alpha emitter it is difficult to detect with Geiger counters and analytical methods are costly. However, environmental samples can be checked for alpha activity relatively cheaply using a special plastic called allyl diglycol carbonate or CR39. Pieces of this clear plastic, about 1mm thick, register alpha particles which destroy the molecular binding in the plastic, so that when it is exposed to caustic soda at 75 degrees for a few hours, the alpha tracks become visible as small bubbles and can be counted. The method is employed for estimating radon in homes, but can easily be applied to looking for Uranium from weapons.

If you suspect Uranium in a bomb crater, or in a dust sample, it is a costly exercise to send it to a lab, just to find there is nothing there. So take the sample and leave it in contact with a piece of CR39 for a day; use another piece as a control in contact with a piece of earth that is from somewhere below the surface where there is no weapons Uranium. After 12 hrs take both samples and put them into a strong caustic soda solution (about 24g in 100ml) at 75 degrees for four hours. But be careful: caustic soda is terrible stuff. You must wear gloves and eye protection. Then take the plastic slides out and wash them, dry them and examine them under a microscope. A toy microscope will do. You can clearly see the tracks and you can count them. If there is Uranium there you will find many more tracks than there are in the control sample. Uranium particles will give an alpha star (see picture). The samples can then be sent to a lab for confirmation. CR39 strips can be bought from LLRC or from TASL in Bristol. They cost about £20 for 5 pieces including postage. Caustic soda can be bought from any iron-monger.



*Above: The seven clustered alpha tracks in this piece of CR39 show the presence of a hot particle in the ambulance air filter from Beirut.*

*Below: A CR39 slide is placed across a piece of impacted soil from the crater in Khiam. Half of the slide is not on the filter and acts as a control as the alpha range is too small to affect this part*




---

## NO SUPPORT FOR CORWM

---

The Nuclear Decommissioning Authority (NDA) has subgroups of stakeholders looking at waste issues and materials arising from decommissioning. Richard Bramhall has represented the Low Level Radiation Campaign at all meetings of the Waste Issues Group WIG since May 2006.

He made the following statement at the meeting on 6<sup>th</sup> December 2006.

"I am willing to remain part of this group; others may feel it's incompatible with what I'm about to say.

I'm here to speak to particular issues and that's well recognised, but I'm very concerned about other things and I need to put a caveat on the outputs from here.

The Waste Issues Group is not representative; it never set out to be. That's not a problem in itself in groups like SAFEGROUNDS and SD:SPUR where the remit is highly specific and the process inclusive and enabling. But WIG operates on agendas driven by NDA's remit and timescales to receive information about decisions made elsewhere and to provide input which either assists implementation of those decisions or ticks a box for stakeholder engagement. Or both.

Yesterday this came to sharpest focus so far, in discussion about CoRWM. There are serious concerns about CoRWM. They've been well articulated by other people and I don't need to go into them now. My immediate problem is the feeling — it seems quite evident to me — that CoRWM's recommendations remove an obstacle to new build. I need to dissociate myself and the Low Level Radiation Campaign from that. I'd like it recorded and I intend to publish this. I hope you'll agree it (i.e. publication) doesn't break any protocols."

The Waste Issues Group wanted it to be clear that this was a personal statement.

*Notes: SAFEGROUNDS is a stakeholder dialogue developing guidance for the management of radioactively contaminated land. SD:SPUR is a parallel dialogue developing guidance on materials arising from decommissioning.*

## SHOCK and A.W.E.: ALDERMASTON DATA AND GULF WAR 2

### Freedom of Information Act

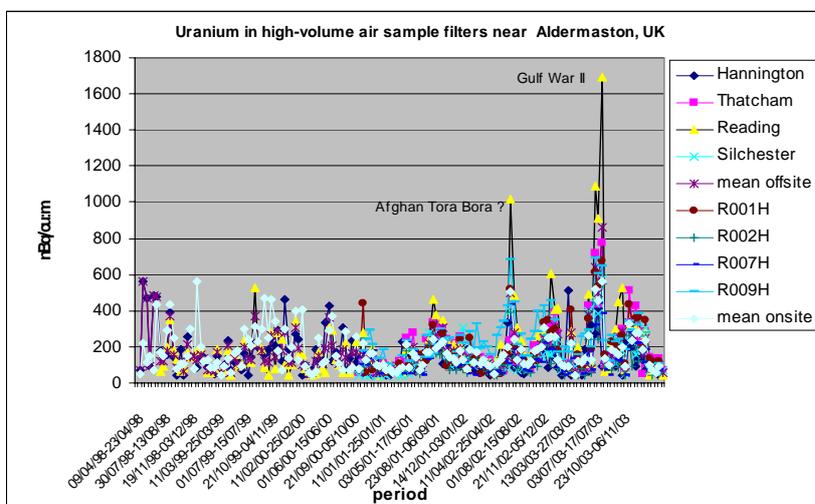
This legislation became UK law in January, 2005. In the same month, Chris Busby wrote to the Atomic Weapons Establishment (AWE), Aldermaston, Berkshire, asking for copies of the results of their environmental radioactivity sampling measurements from 1998 to 2004.

AWE had been legally required to make measurements of plutonium and Uranium in air and water since 1990. The plant has released significant quantities of both these substances into the atmosphere, into the Kennet and Avon canal and the Thames via a leaky pipe to Pangbourne, near Reading, (now decommissioned) and a confirmed excess of child leukaemia in the area has been ascribed by some to exposures to radiation from the releases (Busby, *BMJ*, 1997).

But the purpose of the request had nothing to do with the childhood leukaemias. It followed up an idea that the 2-weekly high volume air sampler records of Uranium might show a peak during the period of Gulf War 2, and confirm the belief that weapons-derived Uranium (WDU) oxide was capable of movements over very long distances indeed. Although the data had been published in the AWE annual reports up to the late 1990s, reports after 2000 no longer included the tables. A previous request for the data, made in 2004, had been ignored but, with the FOI, the situation was changed: they were legally required to produce it.

### Curious mistakes

After about six weeks, AWE sent a bundle of photocopies of the data from 2000 to 2004. These were the two weekly filter analyses from the thirteen sites where the HVAS were deployed. Six were on-site at AWE, and seven were offsite, and as far away as Basingstoke and Reading, some twelve kilometres away from



the plant. The off-site sampling was originally done to enable releases from the plant to be distinguished from background variations in Uranium or Plutonium. But, of course, it could be used in reverse to see if there was an increase in Uranium over any particular period, and this was the purpose of Chris Busby's investigation. As a member of the Ministry of Defence Depleted Uranium Oversight Board (DUOB) he has long argued that WDU oxide is an aerosol capable of travelling over as far a distance as any other aerosol. The military say not. The Royal Society committee say that the material stays near the site of impact: but this is to ignore the huge amount of data that confirms the wide dispersion of Uranium oxide from weapons use. Uranium was measured in Hungary at the time of the Balkan conflict when DU was employed (Kerekes *et al*). It was measured in New York hundreds of miles from a production facility. It was found in over 40% of samples measured by UNEP in Kosovo and was detected in air filters by UNEP in Bosnia. Indeed, the particle size of WDU is in the sub-micron and nanometre range and, theoretically, it is expected to behave as a gas, to be widely dispersible and capable of resuspension from the ground.

The military seemed to have figured out what the purpose of the request was. They omitted to send the data covering the period of Gulf War 2. Those photocopies were conspicuously missing. A second FOI request was made pointing out the apparent oversight. After a long gap, the missing copies turned up, but not from AWE. They were posted from the Defence Procurement Agency in Bristol.

### Uranium in the wind

Gulf War 2 began with the US bombing in early March of strategic Iraqi targets like armoured control centres and radar installations. The full US "Shock and Awe" bombing, which everyone saw on TV screens, began around the 19th March and carried on until the end of April. The global weather patterns in early 2003 were unusual. From February to May, winds were blowing north from Africa and the Middle East. A Saharan sand episode (where sand particles are deposited on the UK) was reported for February. So conditions were right, in principle, for the transfer of WDU from Iraq to Europe, if large quantities were being used in Iraq. The data were painstakingly copied into a spread-

sheet by Saoirse Morgan (below) and plotted. In the entire period between 1998 and 2004 the only six-week period in which Uranium in air significantly exceeded the mean background level in all the filters, both on and offsite, was the six-week period of Gulf War 2. An Analysis of Variance which compared a hypothetical war period (March 19th to the end of April) with a non-war period (the rest of the data) showed a high degree of statistical significance (see Table).

**Shock and AWE**

The research paper by Busby and Morgan was published in the *European Journal of Biology and Bioelectromagnetics* (2005, 1(4) 650-668) The story was reported in the *Sunday Times* of February 19th, 2006 and was picked up and rapidly spread globally. The paper, besides establishing that there was a significant increase in Uranium, used weather pattern air-flow computer modelling to show that, over the period, air from Iraq moved north and came across Europe, following the airflows determined by the pressure systems which were dominated by an anticyclone over Britain. The finding had tremendous importance for two reasons. Firstly, it showed that WDU was a weapon of global dispersal and indiscriminate ef-

Filter	Not war	War		
	Mean	SD	mean	SD
Hannington	116.6	78	259	158
Reading	201.3	152	1230	409
Silchester	134.4	78	468	100
Thatcham	168.9	97	641	181
<b>Offsite</b>	<b>155</b>	<b>101</b>	<b>650</b>	<b>212</b>
R001	166.4	105	606	69
R002	111.7	62	411	154
R007	117.3	69	382	61
R009	220	106	649	42
<b>On-site</b>	<b>154</b>	<b>85</b>	<b>512</b>	<b>82</b>

*Statistical data for the four offsite and four on-site AWE high volume air sampler results (nBq/m<sup>3</sup>). Period 29/06/00 to 04/12/ 03 representing 89 two-week periods of which three, 13/13/13 to 24/04/03 are those designated 'war' and 86 were designated 'not war' for ANOVA and logistical regression. Means and standard deviations shown. One way ANOVA gave p<0.000; F>50 for significance tests of differences between all off-site sites individually except Hannington for which p=0.004. For all off-site sites combined and also for all on-site sites combined p<0.000 for test of 'war' against 'not war'.*

fect, like a poison gas and, therefore, should be illegal. Implicitly, the whole population of Europe are affected. Secondly, it showed that large quantities of Uranium weapons must have been used in Iraq in GW2, despite denials by the military, and this is a theme we return to when considering the Uranium in urine results of the UK Gulf War 2 veterans. On the basis of the mean increases in air near AWE and a Uranium oxide particle of mean diameter 0.1 micron, using ICRP standard respiration parameters, it is possible to show that everyone in the area near Reading will have inhaled more than two million particles of WDU.

The paper received several attacks but, interestingly, the most concerted were from certain members of the anti-DU fraternity. Dan Fahey, who sent an unsolicited peer review of the paper to both the European Journal of Biology and the MoD Depleted Uranium Oversight Board, based his main argument on the idea that, because of the Earth's rotation, material from Iraq could not flow north west to England.

One Franz Schoenhofer, an ex IAEA and Austrian Radiological Protection Board scientist, argued that the material may have been from AWE itself. Brian Spratt, the Chair of the Royal Society committee told the newspapers that the increase was from 'natural Uranium' blown from Iraq because the bombing had stirred up the dust there. None of these arguments can be seriously deployed. Chernobyl radiation blew 1800 miles westwards to Wales, where it still contaminates the uplands. Releases from AWE would give a higher reading in the on-site filters than in the offsite filters. It is not possible to avoid the obvious conclusion that GW2 contaminated Europe (and probably, therefore, the world) with WDU particles - carcinogenic, mutagenic and environmentally long lived. The use of Uranium weapons represents a serious hazard not only to the military but to local civilian (Cont'd)

*(Continued from previous page)*



*Green Audit's Saoirse Morgan typed in all the AWE data.*

populations and now, we see, distant civilian populations also. What will the effect be? Well, it is hard to say. Increases in infant mortality, in birth defects, in cancer? Certainly. Add the Uranium effect to the queue of other mutagens that the nuclear and military complex have wished upon the world since 1945.

*A copy of the Busby Morgan paper can be obtained on request from LLRC.*

---

### WHERE IS DEMOCRACY?

---

What was missing from CoRWM was a proper examination of the health issues. Fred Barker's NuLeAF operation will not be telling the Local Authorities about the health issues either. But at the end of its life, CoRWM belatedly approached LLRC for an input, largely due to the nagging of one member, Pete Wilkinson. Chris Busby, as Secretary of the European Committee on Radiation Risk, was commissioned by CoRWM to advise on the ECRR risk model implications for the hole in the ground scenario as modelled by NIREX. An independent 40-page report was commissioned by CoRWM and produced. After further discussion the ECRR model implications were agreed and are apparently being incorporated into CoRWM's final statement. The results show that the worst case dose to members of the public living near the hole in the ground could be 200 times annual natural background; certainly the application of the ECRR model, which CoRWM concedes may be correct, will have huge implications for those living near the hole. Barker's operation should give space to these considerations at each of the meetings with the Local Authorities. Democracy requires that the public should know the down side of any decision.

---

## NuLeAF: SON OF CORWM LOCAL COMMUNITIES BEWARE

---

NuLeAF is the self-styled Nuclear Legacy Advisory Forum. It is the government's fifth column in the attempt to put Nuclear Waste in a Hole Near You (NuHoNY), especially if you live in a poor area. Having set up one bogus outfit (CoRWM) to find through 'stakeholder dialogues' that the best option for nuclear waste was to tip it into a hole and tiptoe away, there yet remained the question of how to implement such a process in the teeth of the public's opposition to having the waste near them and to watch their children die of cancer. CoRWM having performed its job, a new outfit was needed. Enter NuLeAF, ([www.nuleaf.org.uk](http://www.nuleaf.org.uk)), alias Fred Barker, who was also a member of CoRWM and could write (to himself) welcoming the final report advising the hole option.

Investigation of the website shows that NuLeAF was funded in 2005/6 by the Nuclear Decommissioning Authority NDA (£60,000) and NIREX (£25,000). In the next year it will get a £40,000 income from DEFRA and increase its income from the others to a total of £121,000. Fred Barker estimates his income as Project Director for the next two years as £110,000; he will have a Personal Assistant earning £48,500 and also a Project Officer earning £58,000. OK, so what will these three do for all this money?

They'll go around the country bribing local authorities to agree to have the hole in the ground near them.

### Enabling CoRWM on the ground

The important point to note is that decisions about where the nuclear waste will be put, *where the hole is*, will *not* be made by local communities. It will be made by Local Authorities (in consultation). We all know what that means. In Ceredigion, where the town of Aberystwyth is, planning decisions about the town

are made in the County Council, which is based in Aberaeron and has members from all over the county. Decisions opposed by the Town Council are routinely implemented by the County Council. And in the case of the nuclear waste, shed loads of money and massive planning gains are to be offered to gain the acceptance of the hole. It is NuLeAF's job to facilitate this bribery. Dressed up as Regional Seminars and other meetings, Local Authorities will be bribed at whatever level it takes to find somewhere to put the waste. And, of course, this is an issue of Environmental Justice. Because make no mistake: it will be the poor areas where the authorities will take the bait. It will not be Stratford on Avon, or Guildford where the hole ends up, but somewhere in Wales, or Cheshire, or the West Midlands, where poor people can suffer the increases in cancer and the deaths of their children, so that various local councillors can benefit, or the area can obtain a new Leisure Centre. And these Authorities will not be told the truth about the health effects of the substances in the hole or the migration of these substances into the bodies of their children.

The Regional seminar for Wales held in Llandudno on 22 November, 2006 lists as attendees only councillors and local authority bureaucrats. Included for Gwynedd Council are Dylan Rhys Griffiths, Regeneration Programmes Manager, Sioned E Williams, Head of Economy and Regeneration. Regeneration is appropriate; another phrase might be *New Growth*. Then poor people will get more cancer (a well known phenomenon). They smoke more!



## Soapbox

*We are often accused of being anti-nuclear and of doctoring our scientific research to obtain results that show the existence of cancer near nuclear sites. But the truth is, it is the data itself that speaks. And what it says is that these effects exist: and since innocent people are dying, it is impossible at that point, after the discovery, to not be anti-nuclear. To remain aloof is not an option. This is really a problem with democracy, a system of government 'by the people for the people' which was begun at a time when science was in its infancy, and the main threats to the public were easily understood by the politicians who represented them. This is no longer the case.*

I recently spent two years working for the Science and Policy interface of the Policy Information Network for Child Health and Environment.

PINCHE ([www.pinche.org](http://www.pinche.org)) is a project of the EU aimed at obtaining the best advice on prioritisation of finance, legal changes and research efforts in the area of children's exposures to toxic environmental agents, e.g lead, dioxins, radiation etc. PINCHE consists of senior scientists, doctors, epidemiologists and other experts from universities and institutions from all across Europe and the idea was to look at all the literature with regard to the effect of each exposure and come up with a final decision on how dangerous the exposure was, and advise the European Commission in the final report. There were six research groups: Exposure, Epidemiology, Toxicology, Risk and Health Impact, Socio-economic Factors and Science/Policy Interface. It was this final one that I was responsible for facilitating.

The process was concluded in 2006 with five reports, one from each group, and a final report summarising the findings. It was clear to me from the outset that the main problem in this area was political tension between the economic viability of a country (what is called 'competitiveness') and the toxic exposures of its citizens. If

environmental laws in the UK are more stringent than in France with regard to recycling of radioactive materials then this gives France an economic advantage. But only at the expense of exposing French citizens to radiation which will increase the cancer rate in children. But the cancer rate is not part of the economic equation and so can be ignored.

The problem is this. Politicians do not understand science [1]. For modern threats to health from toxic exposures, expert knowledge is needed. Special (and expensive) measuring equipment is required. Depleted (or natural) Uranium has to be measured with mass spectrometers. Radiation is invisible. Chemical exposures -from dioxins, from lead, mercury, lindane- all require expert knowledge and equipment to assess. So the politicians set up expert committees and expert advisors. Industry sets up lobby groups and funds scientists in universities and institutions to conduct research showing that the exposures are OK. And although scientists are supposed to be agnostic and to find the truth, what happens in the real world is that scientists who want to continue to get research funding don't look too closely at results that suggest that the products of industry might be killing people. This has been an open secret for

years, but in the case of the carcinogen trichloroethylene, the story of how industry has biased the perception of risk and delayed legislation in the EU has been studied by the philosopher Christina Ruden in the Karolinska Institute in Sweden . As a result of our deliberations, in the final report, PINCHE stated: *The acquisition and handling of scientific environmental health data may be culturally biased by the needs of the institution handling the data and making representations about its meaning. This is the key area for argument in the case of science and policy. . . . The transposition of the science of trichloroethylene carcinogenicity into policy showed clearly the alarming uncertainty introduced by the various scientific players and organisations involved, who were from industry, academia and governments, and were pulling in different directions through different interpretations of the same data.*

This need to rely on scientific experts means that democracy has now failed, since the experts responsible for the decisions are not elected by the people. It is worse, they are actually connected to the institutions that cause the pollution in the first place, either directly or through the hook of university funding. What is to be done? Well, the answer is the oppositional science committee where independent scientists are funded by government to oppose, as in a court, as in parliament, any proposed policy change that might result in harm.[2]

[1] Bramhall R, Busby C and Scott Cato M (2000) *I Don't Know Much About Science Abersywyth : Green Audit*

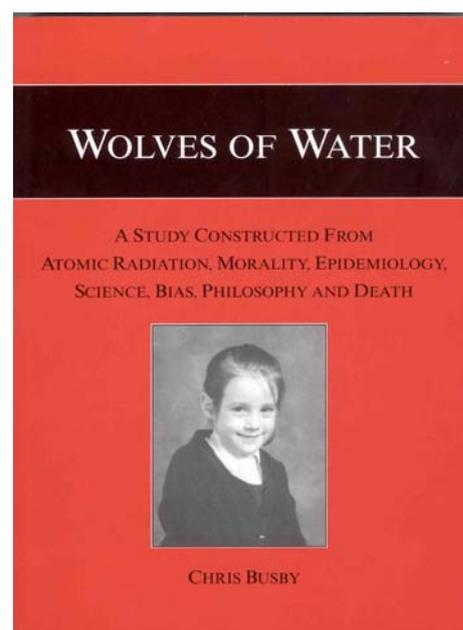
[2] Van den Hazel P, Zuurbier M, Bistrup ML, Busby C et al [2006] *Policy and science in children's health. Acta Paediatrica* 95 S 114-119

## PRESENTING: *WOLVES OF WATER*

Light and dark. Good and Bad. The Dark Side. These themes from the night time recesses of our folk memories recur in literature, poetry, film: they are as old as time itself. In the scientific daylight in 2006, with the planet in danger, with massive expansion of industry, of pollution, of war, terrorism, threats of the effects of global warming, species loss, new diseases, even in this rationalist western world illuminated by the stark light of scientific empiricism no one can quite bring themselves to laugh about these deep ancient fears and pass them off as fantasy, or the stuff of dreams and cinema. There has always been an underlying public suspicion that the superficial events that influence their lives, and the explanations of these events which are common currency, do not address the underlying political truths. They suspect there is a real story which they are not being told. They are right. And from time to time, stories emerge that demonstrate this. This is one such story. *Wolves of Water* shows that the developments and advances of science have brought in their train devastating illnesses, and an even more devastating change in the way in which we now see the world. Since 1992 Chris Busby, scientific maverick and green activist, has single-mindedly pursued a systematic and searching investigation into the health effects of radioactive pollution and in doing so has slowly uncovered the elements of an extraordinary high level cover-up of the environmental causes of cancer. And worse: the discovery of a new phenomenon. Science induced blindness. *Wolves of Water* is the culmination and conclusion of the author's research over the last fifteen years into the health consequences of exposure to planetary radioactive contamination of the food, the air and the water. By 2001 Busby had become a member of two UK government committees set up to examine the issue and, in 2002, had become policy leader of a large EU funded committee (PINCHE) examining and advising on the translation of scientific research into policy. The discoveries he had made on the bias, secrecy, and near-criminal activities of policy makers and their advisors operating at the highest level showed that these problems of secrecy and cover-up were not restricted to the area of radiation and health. They were institutional, and arose from a simple tension. The tension was between industrial expansion and competitiveness in the global economic market on the one hand and, on the other, millions of deaths from exposures to the poisons released into the environment from these same processes. This tension is at the heart of all the discussions that presently direct the course of spaceship earth: and if they are not properly resolved, resolved on the basis of the truth, then the future is bleak. This is the main message the author has for the planet: beware of the claims of scientific thinking. Beware of the claims of science to objectivity. There are bad people and good people. There is light and dark. The folk tales were right and are still right. And, in this book, the author introduces you to some of the real actors on both the dark side and the light, in this real story of the real world in 2006, naming names, demonstrating cover-ups and whistleblowing on the health protection system of the developed world.

### Scientific Advice

Official science in the United Kingdom cannot be trusted and because of this, people are dying. In the case of nuclear radiation and health, all the



official scientific committees to date have consistently advised politicians wrongly. Tens of thousands of deaths from cancer and other genetic-based diseases have occurred in ordinary people living in areas of the UK and Ireland contaminated by Uranium, Plutonium, Caesium-137, Strontium-90 and other novel products of nuclear fission, released from nuclear sites under licences granted by the authorities.

The cover up of the health effects of exposure to this type of radioactivity can be traced back to the period of atmospheric weapons tests (1950-1963) and the connection with the military development of the H-Bomb. An agreement was signed between two UN agencies, the World Health Organisation and the International Atomic Energy Agency (IAEA), which left scientific research into the health effects of radiation to the atomic scientists. Since the late 1980s and the clear evidence that the pollutants from nuclear sites like Sellafield were killing children, there has been a consistent and increasingly energetic and costly high-level cover-up of the link between radioactive pollution and cancer.

In 1995, the author published his first book on this issue, *Wings of Death*. This new book, which was also funded by the Joseph Rowntree Charita-

ble Trust, took five years to produce.

*Wolves of Water* provides hard evidence that Busby's thesis is correct, is known about, and has been suppressed. It gives chapter and verse, with data, photocopied documents and scientific analyses, naming and shaming the scientists and experts whose advice sanctioned this appalling public health scandal. Within 528 pages, 32 colour plates, 78 diagrams, 105 tables and 750 references, *Wolves* provides all the evidence necessary to conclude that the governments have sanctioned processes that kill the citizens they are elected to protect. The UK government and its agencies continue to desperately cover up the fact that this has occurred, using bogus science, agenda fixing, legal threats, data alteration, closure of entire groups, creation of more fixable groups - every trick available to keep under wraps the cause of the contemporary cancer epidemic: environmental nuclear pollution.

**The solution**

All is not lost, however, and the book provides suggestions for a way forward. Having shown that the science policy advice system is failing the public, Busby proposes a solution. This is the setting up of oppositional science advice committees, where scientists from both sides of an argument are commissioned and funded by government to argue out the consequences of any proposed policy question. The idea has been taken up by the EU PINCHE committee and has been published in their report on Science and Policy in the October 2006 issue of the journal *Acta Paediatrica* (see story). If the BSE committee had been set up as a true oppositional committee, then the Mad Cow Disease disaster would have been avoided. Of course, such a committee has to be honestly conceived and organised, with a truly independent secretariat and agnostic agenda. We all saw how the CERRIE committee failed in this respect. However, the Depleted Uranium Oversight Board (DUOB), run by the Ministry of Defence, has proved to be a model for how such a

committee could be run and could succeed. The final DUOB report will have two sections, one written by the Chair and supported by the majority of members, and the other written by Dr Busby and Prof Malcolm Hooper and supported by a minority, mainly the veterans and their advisors who believe that the testing has been too late to show any levels of uranium picked up as long ago as 1991.

***Wolves of Water***  
 ISBN 1897761 260  
 may be ordered from any book shop or preferably obtained direct from the publisher :  
 Green Audit Books  
 Castle Cottage  
 Sea View Place  
 Aberystwyth  
 SY23 1DZ  
 or email:  
[admin@greenaudit.org](mailto:admin@greenaudit.org)  
 Price £12.00  
 plus £5 postage

**U-TURN ALLOWS ACCESS TO MORTALITY DATA  
 HINKLEY BREAST CANCER CONTINUES**

Green Audit has analysed cancer mortality near Hinkley Point and other nuclear power stations (Bradwell, Oldbury) in a number of studies carried out since 2000, using ward level data from the office for National Statistics (VS4D Tables). Indeed, GA has been developing a Java program that will give ward level cancer risk for the main cancer types in every ward in England and Wales. In 2001 access to the data was suddenly blocked. A letter from ONS's Alison Holding to Green Audit explained that ONS had decided that the data were confidential and that no VS4D tables after 2001 would be released. However, the Scottish ISD had meanwhile been releasing the Scottish data, including childhood leukaemia data, to Green Audit. This anomaly was brought to the attention of the attendees of the International Workshop of the CERRIE committee at St Catherine's College Oxford. No one could see why ONS was carrying forward such a ridiculous control of the data on the basis of 'confidentiality'. After all, in the case of mortality data, even knowing that there was a case of cancer in a population of 2000 people, the people are dead, and tracking them down would be pointless. Following continued pressure from LLRC and Green Audit, and a groundswell of opinion on the issue, in 2006 ONS made a U-turn and released the data. This will enable studies of cancer mortality near nuclear sites to continue. Of course, in England and Wales (unlike Scotland) there is still only access to data for the main cancer sites (all malignancy, lung, colon, breast and prostate). What is really needed is incidence data. An update of the Burnham on Sea breast cancer deaths to 2005 is shown below. There continues to be a significant excess downwind of Hinkley in the 16 years 1995-2005.

	1995-2000	RR (p-)	2001-2005	RR (p-)	1995-2005	RR (p-)
<b>Burnham N: Obs</b>	26	2.0***	15	1.4	41	1.7***
<b>Exp</b>	13.1	0.001	10.9	0.15	23.9	0.001
<b>Burnham S: Obs</b>	17	1.4	6	0.6	23	1.0
<b>Exp</b>	12.1	0.1	10.1	0.93	22	0.44

*The Table shows Observed and Expected Deaths from breast cancer in Burnham North and Burnham South. The recent U-turn on mortality data from ONS enabled examination of Relative Risk (RR) after 2001.*

## ECRR 2003 RISK MODEL ARGUMENTS SUPPORTED BY FRENCH OFFICIAL RADIATION RISK COMMITTEE

### Institut de Radioprotection et de Surete Nuclaire (IRSN) report DRPH/2005-20: Health consequences of chronic internal contamination by radionuclides. Comments on the ECRR report "The health effects of ionising radiation exposure at low doses for radiation protection purposes" (In French)

This astonishing document was brought to LLRC's attention when, in January 2006, we received a phone call from the *Le Monde* correspondent asking for a comment. The French IRSN report, published on 9<sup>th</sup> Dec 05, is the culmination of its study of the arguments and recommendations contained in the ECRR 2003 report. These arguments were also presented to the UK CERRIE committee between 2001 and 2004, to the UK Depleted Uranium Oversight Board and to the Royal Society Depleted Uranium Committee (2001-2002).

Since the IRSN is an official organ of the French State, the new IRSN report represents a sea change in official thinking on the matter of the security of the risk models of the International Commission on Radiological Protection (ICRP) as applied to chronic internal radionuclide exposure at low doses.

The IRSN report was the result of two years research by a committee of 15 senior radioprotection experts collected together with the express purpose of examining the arguments and claims made in ECRR 2003. This research was aimed at the scientific content of ECRR 2003 and left aside examination of its philosophical and ethical chapters. The IRSN report begins, in its preface, by agreeing that the questions posed by the ECRR are *valid and deserve a debate* and that the ECRR have raised *fundamental questions with regard to radioprotection*. It begins by contrasting the approaches of the ICRP and the ECRR to radioprotection and agrees that for certain internal exposures the approach of the ICRP is strictly invalid, citing (p6) *heterogeneous distribution of radionuclides, the validity of weighting factors applied for calculating internal doses, the impact of the radionuclide speciation on their behaviour and their chemical toxicity*. They further specify issues that are raised by ECRR (p7) and agree that they are valid and need addressing. These include the pertinence of the use of the external Hiroshima based risk factors, the lack of direct epidemiology of internal chronic exposures and the problems of the new scientific

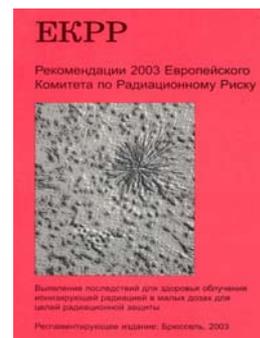
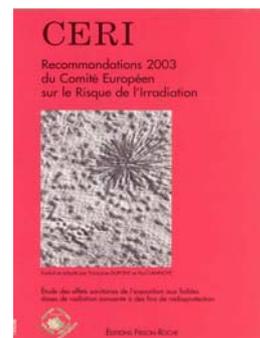
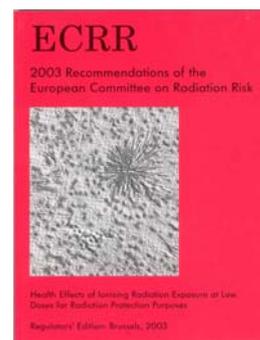
discoveries, which ECRR and the CERRIE Minority report state falsify the ICRP model. The IRSN report tentatively agrees, stating (p7) *since the ICRP60 publication, improvements in radiobiology and radiopathology or even general biology finally might impair [falsify] the radiation cell and tissue response model applied to justify radioprotection recommendations*.

On p16, IRSN agree with ECRR that the ICRP reasoning on averaging dose: *may be criticised as we are now aware that numerous radionuclides are highly heterogeneously distributed among all tissues* They continue: *The ECRR considers that particle concentrations in tissues, locally generating high radiation doses, are more carcinogenic than when the same amount of energy is uniformly deposited in tissues. A set of studies, basically conducted in *in vitro* systems, appears to confirm this assumption*.

The IRSN report goes on to examine many areas where the ECRR has called into question the risk models of the ICRP and agrees that the questions are valid and may have resulted in the misapplication of risk analysis, citing Chernobyl as an example. IRSN agrees that other end points apart from cancer should be considered as outcomes of chronic internal exposure and cites the discoveries of Bandashevsky regarding childhood cardiac and other pathologies. IRSN continues with its own discussion of chronic internal exposures, pointing out that for some isotopes, particularly uranium, chronic internal exposure carries greater harm, dose for dose than acute internal exposure.

ECRR 2003 has now been published in French, Russian, Japanese and Spanish. The English Edition is in its 3rd printing. It is being increasingly used as a valid alternative model to ICRP for official considerations of risk and in legal cases. The ICRP model, on the other hand, is increasingly seen as unsafe and out of touch with reality by the policy makers. For example, the new 2005 draft ICRP risk model made no reference to Chernobyl and omitted many key citations of peer-reviewed research. The US BEIR committee report is no better in this regard. These official nuclear risk agencies hope that by burying their head in the sand they will survive. The IRSN clearly aren't prepared to go along with this.

*LLRC subscribers can get ECRR2003 for a concession £15 + £2 from Green Audit, or by emailing Greta Bengtsson:*



## *The Low Level Radiation Campaign*

LLRC began as a Green Party Campaign in 1993, but became independent from the Green Party in 1996 with a modest grant from the Goldsmith Foundation and the publication of the first Radioactive Times. Since then, LLRC has operated continuously, carrying out and commissioning research, publishing results on its website ([www.llrc.org](http://www.llrc.org)) and in articles and books. It has always operated on a shoestring -the work being carried out mainly by Richard Bramhall and Chris Busby, along with many other activists and helpers giving time, effort and writing RaT stories. Among these must be mentioned Molly Scott Cato, Wendy Gilford, Paul Dorfman, Helen Rowe, Saoirse Morgan and Mireille de Messieres. Until 2002, the printing of RaT and leaflets or flyers was carried out on LLRC's own A3 printing press, acquired in 1997.

The Campaign has become the acknowledged global site of expertise on the Health Effects of Nuclear Radiation. In its 11 year operation, LLRC has unquestionably altered the whole area of anti-nuclear activism, moving it from a vaguely alarmist and unelaborated, fearful opposition to the effects all things atomic, to one of tightly argued and scientifically supported analysis of the effects of radiation on living systems, both theoretical and epidemiological. In 1993, following the failure of the UK Sellafield child leukaemia trial and the death of the prosecution's epidemiologist Martin Gardner at the age of 50, the anti-nuclear movement was in schizophrenic disarray over the reasons for its opposition. It was not believed that the movement had the scientific expertise to counter the arguments of the pro-nuclear scientists. By 2006 LLRC had changed the situation beyond recognition. The risk models of the pro-nuclear scientific committees, the International Commission on Radiological Protection (ICRP) and the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) have been shown to be bankrupt, and are now being attacked even by the French Nuclear Risk Agency IRSN (as we show in the report in this issue). The new European Committee on Radiation Risk (ECRR), organised through the efforts of Chris Busby and others in 1998, is rapidly becoming the light which will sweep away the nonsensical nuclear risk models that have supported the operation of the nuclear industry for the last fifty years. The Campaign has been attacked and dismissed from the beginning by the nuclear industry and by their scientists. It has been vilified by the government risk committees (COMARE) and the risk agencies (NRPB), but because what we say makes scientific sense we have been able to dismiss these attacks easily and the authorities are now on the back foot. Our credibility now is such that we are being routinely brought in or consulted in stakeholder dialogues, in government and European committees and in Law Courts in radiation cases. This has been achieved by staying the course, focusing on each case and never giving up. It is our intention to see the acceptance, by the political systems and scientific community, that internal contamination of living systems by fission products like Plutonium-239, Caesium-137 and Strontium-90 has terrifying consequences for health and has been the cause of the increases in cancer and other genetic diseases that we see today. This will get worse if fission-product releases continue, with the construction of new nuclear reactors.

This is the leak that will sink the nuclear ship. Acceptance of this link between fission product contamination and cancer will make it impossible, under the present legislation, to build new nuclear power stations. It is as simple as that. The government can always mobilise economic arguments for nuclear energy. They cannot mobilise any argument that enables them to build structures that kill their citizens.

It is curious that after such successes - forcing the formation of the CERRIE committee, preventing the UK acceptance of the Euratom Nuclear Waste Recycling Directive, altering the playing field on radiation risk in the UK, Europe and the world, raising the Depleted Uranium issue- that we should be in difficulties over funding. But we are. The last grant we received was for £15,000 in 2004 and, since then, we have operated on small sums sent by some individuals and small standing orders from others. Please help us continue if you can afford to. There is a Standing Order Form enclosed in this *Radioactive Times*. The more we have, the more we can do - and the more we will do.

### *Support the Low Level Radiation Campaign*

I would like to subscribe to *Radioactive Times*:

Name

Address

I enclose a cheque for £6 (individual or £12 (groups) payable to 'The Low Level Radiation Campaign'

I would like to help the campaign with a donation of £10, £20, £ (Other) to support independent research into low level radiation and health.

The Low Level Radiation Campaign, Bank Code 40-30-05; a/c No 51384007

## *Editorial*

Radioactive Times is back again with this latest issue. There has been no publication of RaT since May 2005; this is partly because we have been busy studying the problem, carrying out research and putting out the message in other ways, but partly, also, because we have not had any funding from our usual source: they made some strategic decisions in 2003 to move funding support into projects related to global warming and trying to affect the outcome of the energy review. Chris has also been rather busy working on various books and reports for the European Committee on Radiation Risk (ECRR), whose report ECRR2003 has now been published in French, Russian, Japanese and Spanish and whose 2006 report on the health effects of the Chernobyl accident he helped produce in April this year. In addition, we had to move our printing press to another location and have various problems associated with that. Richard Bramhall and Paul Dorfman have been heavily involved in different stakeholder dialogues and nuclear consultations. However, with regard to funding, many of you have helped us with small sums from time to time, and we feel we should let you all know what has been going on and where we are going at present with the campaign.

The current belief climate regarding nuclear energy is quite different from the one that we left in May 2005. We have seen the nuclear industry making a comeback over the issue of Global Warming, which has now taken centre stage in the minds of environmentalists. We now have the extraordinary sight of George Monbiot in the Guardian telling us that 'nuclear may be safe but we still don't want it'. We have had to listen to James Lovelock tell us how it really is safe, and how the Green movement has done humanity a disservice by its irrational opposition to nuclear. The anti-nuclear movement itself now seems in disarray over the issue of low dose radiation, split at the point of the CERRIE committee reports, and divided over the applicability of the concept of dose to internal radioactivity. Meanwhile, LLRC has soldiered on. Studies of the increases in cancer around Trawsfynydd Nuclear Power Station Lake in Wales, reported in the S4C TV documentary in June show the devastating consequences of living near a source of radioisotopic pollution. The arguments about the childhood leukemias near the Menai Strait have reached the point where we have been able to show unequivocally that the Wales Cancer Intelligence Unit (WCISU) has made serious mathematical and conceptual errors in their analysis, and that COMARE have followed these without questioning them. The question has been resolved to the extent that all now agree that WCISU made such a mistake. Our analysis and their acceptance of their mistake was published in the peer-reviewed Journal of Public Health. These two stories, Trawsfynydd and WCISU are connected and will be reviewed in the next issue of RaT, in time for us to release our new video documentary on DVD.

In this Radioactive Times, we concentrate on two recent stories about Uranium weapons. The first is our discovery of increased Uranium in filters deployed around the Atomic Weapons Establishment in Aldermaston at the time of Gulf War 2 in March 2003. The other is about our discovery of enriched Uranium in weapons used by the Israeli Defence Force in southern Lebanon. LLRC continues to research Uranium weapons. Chris Busby represents LLRC on the MoD Depleted Uranium Oversight Board.

The issue of low dose radiation and its health effects is critical to the arguments about nuclear new build. The policy makers and the public have to know that the radioisotopes released by power stations, both during their operation and also on decommissioning and disposal of waste, kill old and young in horrible ways. To tear the atom apart to boil the energy kettle is not a safe option for humanity. But the new way forward seems to be to carry on with the nuclear project by pretending to consult. This is the new scam, and it is discussed in this issue by Paul Dorfman, who has been involved in many of the stakeholder discussions.

*Cover picture: a huge cloud of smoke caused by an Israeli missile at Khiam in South Lebanon. Green Audit examined samples from a crater in Khiam and found evidence of Enriched Uranium: story page 1.*

---

# *Radioactive Times*

---

*Volume 6 issue 1, Dec 2006*

*ISSN: 1365-1803*

*The Journal of the Low Level Radiation Campaign*

---



## Contents

1. Editorial	Inside cover
2. Israel Used Enriched Uranium in Lebanon	1-3
3. Photoelectron Enhancement of Dose	4-5
4. Radioactive Baltic	5
5. ECRR Chernobyl-20 Years On	6
6. DAD is Dead, long live UNCLE	7
7. Carry on CORWM	7-8
9. LLRC film Unit	8
10. Uranium Detector	9
11. No Support for CoRWM	9
12. Shock and A.W.E. Aldermaston data and Gulf War 2	10-12
13. NULEAF: Local Communities Beware	12
14. Where is democracy? NULEAF and nuclear waste	12
15. Soapbox: Chris Busby on 'Scientific Advice'	13
16. Presenting a new book: 'Wolves of Water'	14-15
17. U-Turn on access to cancer data, Burnham on Sea	15
18. ECRR 2003 Risk Model questions supported by French Experts	16
19. Low Level Radiation Campaign	Inside cover

*Radioactive Times* ISSN 1365-1803 is the Journal of the Low Level Radiation Campaign. It is published by LLRC, The Knoll Montpellier Park, Llandrindod Wells, Powys, LD1 5LW a Company Limited by Guarantee and produced by Green Audit Press, Aberystwyth. The Editor is Mireille de Messieres. Contributors to the present issue include Richard Bramhall, Chris Busby, Dai Williams, Paul Dorfman and Per Hegelund. Further copies of this issue may be obtained by contacting LLRC at the above address. The issue will also be put on the website for download at [www.llrc.org](http://www.llrc.org). The next issue is planned for May 2007.