

2nd December 2006

Dr. Roger Cox,
Director
Health Protection Agency - Radiation Protection Department

Dear Roger,

On 30th November the Low Level Radiation Campaign wrote to you and the Dept. of Health about the availability of Polonium-210 and the consequent threat to health. We criticised HPARP's statements that obtaining Polonium-210 depends on access to reactors or particle accelerators, pointing out in detail the methods by which it can be isolated and made available for terrorism without such high-tech equipment. (In the interests of security we are not repeating the detail, since we intend to publish this letter immediately.)

In a faxed reply the next day (1st December 2006) HPARP's Dr. Michael Clark dismissed the methods we described as "various hypotheses" and said they were a matter for the police and security services. Our letter was seeking reassurance that HPARP is treating this matter appropriately. Michael Clark's letter gives no indication that you don't believe your own rhetoric about nuclear technology being a prerequisite for obtaining Polonium-210, and no indication that you would give viable advice if the security services asked for it. The situation raises worrying questions about HPARP's competence.

Dr. Clark's letter also shows a worrying disregard for the gravity of the threat. Standard textbooks and the internet provide abundant information enabling people with no great knowledge to figure out the amount of Polonium-210 needed to kill. The analysis we provided to HPARP yesterday shows that a particle weighing less than 5 nanograms would deliver a fatal dose of 2 Sieverts if inhaled. Particles this small are invisible to the naked eye. From the questions journalists are asking us it is clear that such particles are present in the air on board the grounded airliners. We have to assume that they are formed by evaporation of the liquids in which they were originally transported, as we described on 30th November. We also have to infer that particles smaller than 5 nanograms are present. The radiological effects of the smaller particles would not be trivial.

The authorities' position on protecting public health reveals three deficiencies:

1. Understating the inhalation hazard;
2. Misunderstanding the relevant radiological considerations. Dr. Clark writes of the disputed outcome of the Committee Examining Radiation Risk of Internal Emitters (CERRIE). However, the health effects we have discussed are those predicted from the conventional risk estimates of the International Commission on Radiological Protection (ICRP). We made it plain that in calculating the mass and risks of particles we used ICRP's dose coefficients;
3. A *de facto* threshold. Evidence we have received from people concerned about their possible exposure to Po-210, as well as news reports quoting HPARP / DoH statements, reveals an official complacency which is at odds with your

own Linear No Threshold model (LNT). HPA is not taking calls on this topic and NHS Direct insists on speaking only to "patients" who, on completing a questionnaire, are told they have nothing to worry about unless they were in contact with Alexander Litvinenko or were on one of the three BA planes. They are given no advice. This means that HPARP and DoH are making large and unsustainable assumptions about doses which, since there is no public information on levels (only repeated reassurances that level are "low") cannot be verified. Members of the public will receive no attention unless they are suffering acute effects. But your LNT model predicts that there is no cut off of concern at the point below which deterministic effects are obvious; it unequivocally predicts effects (*stochastic effects*) occurring later and with no certainty that they'll occur in any individual but a certainty that they **will** occur in the exposed population with a likelihood proportional to dose — a lottery with cancerous, and in some cases fatal prizes. This is why we asked you at HPARP for assurances that all passengers would have urine tests for Po-210, and that their medical cards would be flagged for later epidemiological analysis. Michael Clark's letter must be taken as saying that these precautions will not be taken. You have thereby created an arbitrary threshold of regulatory concern below which people are left to prove that they are affected but with no means of proving it and with no long term follow-up. How do you sustain this, ethically?

In addition to discussing the situation in terms of the conventional LNT model it is necessary to consider the scale of what CERRIE left unresolved and the *Radiation Research Strategy* subsequently published by the Department of Health. The DoH shopping list includes such fundamental matters as:

- How can the characteristics of ionising radiation affect health risk? To what extent are radiation quality, dose rate, micro-distribution and energy important factors in determining the risk following exposure to a particular type of radiation such as alpha particles?
- What tissues are relevant to radiation-induced health detriment? Will these vary during the different stages of biological development and does the variation depend on radiation type?
- Can radiation-induced (the) [health] effects be clearly distinguished?
- To what extent are health effects from internal radiation quantitatively or qualitatively different to those from external radiation?
- Can it be determined whether radiation damage is non-linear at low doses and low dose rates?

The DoH list confirms that there's a fundamental ignorance at the root of radiation protection and is backed up by the CERRIE Majority Report's assertion that dose is meaningless in some circumstances. This means Dr. Clark is mistaken in dismissing CERRIE — you have no grounds for denying that the medium- and long-term health effects of the present emergency could be much worse than LNT predicts.

A precautionary approach to the Polonium-210 situation, not to say a humane one, requires at least that all known exposed people are followed up to see if their health demonstrates any deviation from what is expected on the basis of ICRP's LNT assumptions. In this context we note the large overlap of staff between HPARP and

ICRP, and the total absence of Chernobyl studies from the latest draft of ICRP's forthcoming Recommendations. Chernobyl is unequivocally the greatest opportunity so far for the human race to study the effects of fallout and we have suggested in other forums that ICRP's silence amounts to systematic theft of that opportunity. The present emergency is another opportunity. Are you going to steal this one too?

We repeat our request for a meeting to discuss these matters. It is, after all, possible that LLRC's advice to the public might converge with HPA's. I am sure you can see that this would be a desirable outcome.

Very sincerely

Richard Bramhall