

# **BAN URANIUM WEAPONS *NOVEMBER 6 PANEL***

*On the precautionary principle  
the DU Draft Convention  
the burdon of proof  
and the ICRP*

With presentations by:  
Dr. Keith Baverstock  
Prof.Dr. Manfred Mohr  
Mr. Wim van den Burg  
Miss Krista van Velzen

**ICBUW NETHERLANDS, THE HAGUE, 2004**

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# PREFACE

Since the 1991 Gulf War, the US and the UK have used depleted uranium weapons. Soldiers and civilians have since developed mysterious diseases, but are left completely alone by the authorities. In 2003, the International Coalition to Ban Uranium Weapons (ICBUW) was founded. ICBUW facilitates cooperation between a number of organisations opposing the use of depleted uranium (DU) and promotes the DU Draft Convention to ban these weapons.

This panel was the first event organised by the Dutch branch of ICBUW. The presentations and the ensuing discussion were quite fruitful. Dr. Keith Baverstock, a prominent scientist, gave a critical view on the mainstream interpretation of DU risks, in particular on the regulations of the ICRP, the official radiation institute. Prof. Dr. Manfred Mohr explained the DU Draft Convention and suggested possible ways to move forward. The two other panellists, Mr. Wim van den Burg, who is the chair of a trade union for military personnel, and Miss Krista van Velzen, a member of parliament, described their concerns about DU.

On the basis of this discussion ICBUW Netherlands concluded that cooperation between various interested parties seems possible. Scientists, legal experts, military unions and politicians agree that DU should be banned.

The subject of the panel was the precautionary principle. Besides this, many other interesting issues were raised. Among them, the question of proof and the reliability of the ICRP. These issues need to be looked at more closely in the future.

The use of DU has to stop. Civilians and the military suffer unnecessarily. Although one cannot know at what point DU will be rejected or its acceptance stopped, it is clear that every small step can help.

ICBUW Netherlands hopes that this report can clarify some of the issues and open up the debate. We gratefully acknowledge the generous financial support of Novib/Oxfam Netherlands. We want to thank all participants again and hope for a fruitful continuation of our efforts.

Lizzy Bloem  
Amsterdam, July 2005

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# INTRODUCTION

The panel was introduced by Maarten H.J. van den Berg, director of a small independent foreign policy think tank in the Netherlands, Review of International Social Questions (RISQ). RISQ is a member of the International Coalition to Ban Uranium Weapons.

Since 2002, the UN has declared November 6 to be the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict. A number of groups around the world have used this occasion as an international day of action to ban uranium weapons.

In October 2003 a number of groups from the UK, the US, Japan, Belgium and the Netherlands came together in Belgium and formed the International Coalition to Ban Uranium Weapons (ICBUW). This network accommodates grassroots groups, communities in the US who are concerned and affected by test sites of uranium weapons in the US, groups of war veterans, and groups who are concerned about what is happening in Iraq and the use of uranium weapons by NATO forces.

This is an extended report of the seminar held on 6 November 2004 in the Asser Institute in The Hague, organised by the Dutch branch of International Coalition to Ban Uranium Weapons with support of Oxfam-Netherlands (Novib). It is only one of the many events that took place on that day around the world, in Japan, the US the UK and elsewhere. These events are described on the ICBUW website, as is the petition calling for the banning of uranium weapons, which all can sign. The website [www.bandepleteduranium.org](http://www.bandepleteduranium.org) is the prime medium of communication of ICBUW.

The title of the panel, and guideline for the discussion was: 'As long as the risks of uranium weapons are subject to scientific controversy, the use of these weapons should be banned'.

For this occasion ICBUW Netherlands has invited Dr. Keith Baverstock and Prof. Dr. Manfred Mohr as speakers. The speech of Mr. Baverstock is from the viewpoint of a scientist and that of Mr. Mohr from the viewpoint of a lawyer. Both will raise concerns about the use of uranium weapons and suggest possible lines of action.

Dr. Keith Baverstock is a physical chemist by training, his career is marked by his engagement with the health effects of ionising radiation. He was, for example, a member of the international oversight committee for the Radiological Survey of the Marshall Islands, which eventually in 1991 led to the return of the inhabitants of the islands of Rongelap. Dr. Baverstock was chairman of the scientific management team of this rehabilitation project. He has also been a member of the UN Commission inquiring into the human consequences of Chernobyl, 15 years after the disaster, and he was a member of the UK Committee on radioactive waste management which he left after the conference in The Hague (editor). From 1991 to 2003, until his recent retirement, he was Head of the Radiation Protection Division of the WHO. Currently Mr. Baverstock is based at the Department of Environmental Sciences at the University of Kuopio in Finland. In 2001 he co-authored a study on the public health effects of depleted uranium, a study which the WHO, his employer, subsequently refused to publish. The probable reason was that it concluded that the health risks associated with the use of DU in wars, are higher than is currently assumed.

Prof. Dr. Manfred Mohr will introduce the Draft Convention for a Ban on Uranium Weapons. This Draft Convention is promoted by the International Coalition to Ban Uranium Weapons. Mr. Mohr - an International Humanitarian Law expert - is a founding member of the International Association of Lawyers Against Nuclear Arms (IALANA), board member of the German affiliate, and also board member of ICBUW.

Dutch soldiers who have been deployed in Iraq and are suffering from various ailments, such as extreme fatigue, are worried. They started browsing on the internet and read about depleted uranium. They read about the Gulf War Syndrome and that worries them even more. People who are concerned about DU have to be very cautious, but will have to deal with this kind of practical concern in one way or another. That is why also Mr. Wim van den Burg is invited, who is the chairman of the AFMP/FNV, the biggest union of military personnel in the Netherlands, to address this kind of issue and to respond to what has been discussed.

The discussion is about the precautionary principle, which means if one really does not know exactly what the risk of something is, one should be cautious and not use it. Krista van Velzen, a Member of the Netherlands Parliament for the Socialist Party, was asked if she would subscribe to our position. More specifically, she was asked if the precautionary principle is enough for politicians to do something with. Can politicians do something along the following lines: we do not really know what the effects are, we cannot completely quantify it, but there is controversy over it. Is that enough for politicians to say: a ban should be supported, depleted uranium must not be used anymore?

## **PRESENTATION BY DR. KEITH BAVERSTOCK (Verbatim account)**

### **Introduction**

#### *Health effects of a manmade toxin*

DU oxide dust, which is formed from DU metal when a bullet or bomb hits a hardened target and burns, does not occur naturally. The material has no natural analogue. Scientists cannot compare it with anything else. One has to look at DU oxide on its own merits, or see what can be learned from what is known about the basic effects of uranium on health. Uranium is toxic like many other heavy metals. This is known from the early days of uranium processing. Workers were exposed to dust of yellowcake, which is a soluble oxide of uranium and an intermediate in the processing and purification of uranium. It is known that the workers suffered kidney problems.

Dr. Baverstock is considering the long-term problem that one might have, living in an environment that is contaminated with the dust from burnt depleted uranium. The principle concern of Dr. Baverstock with this DU oxide has been the public health interest. He stresses this because there is a group other than the public, the combatants, who also are exposed to DU, but much more closely and in much higher concentrations. He is sure that there are health effects there also, but he has not considered those. In 2000 the WHO was preparing its monograph on the health effects of DU oxide. Dr. Baverstock looked to see whether there would be a case that the WHO ought to investigate this DU more closely. He decided that this was the case and he invited two colleagues, Dr. Mike Thorn and Dr. Carmel Mothersill, to join him in exploring this and writing a publication. That publication is the basis for his speech and this report.

### **Damage by DU on organ level**

#### *Uranium dust from rock is toxic to the lung*

There is some experience with health effects of unprocessed natural uranium, as an insoluble oxide in rock dust, from the uranium mining industry. There is confidence that there is a degree of toxicity for this inhaled material. But the toxicity is not very great. But then, only part of this material is in fact uranium. The rest is rock of various kinds. Also, this uranium is highly insoluble, and therefore retained in the lung. Altogether there is a kind of diluted uranium, which is highly insoluble. If one looks at the lungs of diseased coal or uranium miners, one will find that in particular deep in the lung it is very heavily coated with these insoluble particles or dust. It is accepted as a hazard, but not as a tremendously serious one.

#### *DU oxide dust is also toxic to the bone and the kidney*

DU oxide dust, produced from DU, is quite different from the above mentioned natural uranium. This dust is a 100% depleted uranium oxide (DUO) and also has a soluble component. Mostly it is not very soluble, but very slowly, sparingly soluble. This soluble part gets translocated through the blood and enters the bone through the bone marrow cavities. Dr. Baverstock supposes that there is a potential for leukaemia by this process.

Eventually the DU gets to the kidney and is excreted, but that could be after quite a long period of time. Scientists understand how uranium produces damage to the kidney: uranium prevents the re-uptake of water, or slows up this re-uptake, leading to a greater amount of excretion of water.

A study by a group in Finland has found uranium in the urine of Fins who are drinking water from wells, where there is a lot of uranium in the water. The males in particular excrete something which probably has to do with bone formation. So there could be a toxic effect on bone as well and that is quite consistent with the fact that once uranium gets into the blood it gets into bone.

## **Damage by DU on the cellular level**

### *1. Genetic damage by $\alpha$ -particles*

A DUO dust particle will emit  $\alpha$ -particles, a particular kind of radiation. This radiation has a very small penetration, but a lot of energy. An  $\alpha$ -particle travels around 40 microns, which is only about 3 or 4 cell diameters, and releases about 5 MeV of energy. This is a very short range and a lot of energy is deposited in a very small volume. A DU particle of the size that may be retained in the lung emits an  $\alpha$ -particle between once a week and once a month, depending on the size of the particle. Uranium has a very low specific activity. But these emissions of  $\alpha$ -particles have an effect: chromosomal aberrations, mutations, micro-satellite damage, are examples of damage that can occur in irradiated cells.

### *2. Toxic damage by soluble depleted uranium*

DUO dust particles are partially soluble. Soluble DU migrates very slowly through the cells away from the particles, because DU binds quite effectively to cellular constituents like protein and DNA. Micron-sized particles, deposited deep in the lung, will clear very slowly from there. The concentration of DU around the particle is transiently high due to the dissolution over a period of weeks to months during which it is transferred to the bone and then the kidney

Evidence which came from the Armed Forces Radiation Research Institute (AFRRI) in Bethesda (US) indicates that there is a genotoxic effect in cells exposed both to soluble and insoluble DU. This is observed in laboratory studies and in soldiers who have fragments of DU in their bodies. In cell culture experiments soluble DU and insoluble DU oxide converted cells into a transformed state. When these cells were injected into mice they caused malignancy. Precisely the same effect was obtained using nickel, another heavy metal, which is not radioactive, but toxic like uranium and a well established carcinogen.

The toxic effect of uranium on the kidney is physiological; the uranium changes the structure of the kidney and causes it to malfunction.

For these reasons Dr. Baverstock thinks it is reasonable to suspect that DU has a chemical genotoxic effect too, and thinks that this effect of DU is now a well established phenomenon. Many chemicals are tested for their carcinogenicity by exactly these kind of tests. If they produce transformations in these tests, they are potentially carcinogenic.

### *3. Damage by synergy*

Synergy occurs when two agents have an effect individually and a more than additive effect when present together. An example of a synergy is with radiation and smoking. The effect of the radiation and the chemical effect of the cigarette smoke produces a greater risk if the two are present together. In the case of DU the combined effect of the alpha particles and the chemical toxicity might well be more than additive. The synergistic effect may also, at least in part be a transient effect.

### *4. Toxic damage by the bystander effect*

Having started out as an extreme sceptic, Dr. Baverstock came to accept the phenomenon of the so-called bystander effect several years ago. The theory is relatively new but within the last 10 years it has been well established. The bystander effect was uncovered, not discovered. If one looks back in the literature one finds a lot of earlier evidence.

It could have been interpreted as the bystander effect, but the evidence was just ignored because the dogma did not allow for the effect. It was a real battle for Carmel Mothersill and Colin Seymour, to get the bystander effect accepted by the scientific community. However, it

was not their experiment, but an experiment carried out at Harwell, that led to the general acceptance of the phenomenon.

The bystander effect takes place as follows:

If one cell is irradiated with an  $\alpha$ -particle it is expected that the effects of radiation will be seen only in that cell, but it turns out that some of the neighbouring cells can also start to behave as if they have been irradiated. In other words, they show the typical effects of radiation, such as specific mutations. It is believed that cells send out chemical signals to their neighbours and these chemical signals induce the bystander effect.

In the mechanism of the bystander effect, two processes are known. One is through so-called gap junctions, connections which carry very small molecules between cells. Gap junctions are little tunnels or tubes between adjacent cells through which small molecules can pass. In this way they may induce the effect in adjacent cells. The second process is established from experiments by Carmel Mothersill. In this case cells are irradiated in growth medium, the irradiated cells filtered off and fresh cells put into the medium. One sees 'radiation effects' in the fresh cells without them having been irradiated. Apparently the medium contains something which causes the bystander effect, possibly the same molecules transferred through the gap junctions.

The exact mechanism of the bystander effect is unknown but according to Dr. Baverstock there is growing evidence that the bystander effect is involved in a malignant response. It is not necessary to be too concerned about the mechanism. The argument is that the effects produced by the bystander effect are the same as the effects produced by ionising radiation and ionising radiation is a carcinogen. It is reasonable to assume that there is a potential risk of malignancy from the bystander effect.

## **Testing of DU poisoning**

### *To test for DU is difficult*

The metabolism of uranium through the body is a very complicated process. It is not that simple to relate what comes out in urine to what went in at the initial exposure as that depends on many factors including the time of intake and the exact nature of the exposure. First the uranium has to dissolve from the particle in the lung, then through the blood supply be translocated to the bone, then be re-absorbed from the bone to the blood and pass through the kidney into urine. This pathway is very complex and the process will take several weeks to months. In practice it is most unlikely that exposure will be a singular event so levels in urine are difficult to relate to exposure, unless tests are performed sequentially over several months.

### *Quantitative test and background level*

Soldiers who have been exposed to DU oxide dust should ideally be tested on their background level of uranium before exposure. Urine tests on the background can level still be done after a suspected exposure, for instance in the first week, because there has not been time for inhaled uranium to get into the urine yet. This background level can be compared with the levels later on to determine whether there has been an exposure. The urine test should also be done at intervals much later on. For sure, exposure to DU is seen in a difference in the overall level of uranium. This straight uranium test, over a period of months after the exposure, is also a good indicator of DU contamination if the level of uranium goes up with time.

### *Qualitative test*

Ideally, but it might not be necessary if the exposure is high enough, soldiers should be tested for the isotopic ratio of uranium as well. DU will give rise to a different isotopic ratio between uranium 235 and 238, compared with the natural situation. From the natural sources the ratio

U235/U238 is 0.0073, while DU has a value of around 0.0020. This isotopic ratio can be measured with mass spectrometry. This test is much more expensive, typically a €1000 for each measurement. The test is not tremendously sensitive.

### **ICRP models are unreliable**

#### *The ICRP works mostly with models*

Calculation or estimation of radiation risks is guided by advice from the International Committee on Radiation Protection (ICRP), the International Atomic Energy Agency (IAEA) and the World Health Organisation (WHO).

The ICRP has derived models relating risks to radiation dose. These models are constructed on the basis of epidemiological studies of the risk of cancer seen in the survivors of the atomic bombings in Japan even though the exposure characteristics of internal exposure are very different from in those in Japan. Thus, radiation risks are mostly derived from models and not direct observation.

#### *CERRIE report criticises ICRP models*

Recently, the models of the ICRP have been criticised by a committee in the United Kingdom. The publication states that internal irradiation risks may well have an uncertainty much greater than that which the ICRP presently admits to. This might be in fact a factor of ten in either direction and in a few cases much more; a tenfold underestimation or a tenfold overestimation, depending upon the situation.

In the report DU was, interestingly enough, not identified as one of the issues, but Dr. Baverstock thinks that this is one example where the risk is probably underestimated by the ICRP.

#### *The ICRP models ignore the chemical toxicity of DU*

It is a big problem that the ICRP only looks at the risks of radiation effects and ignores the risks of chemical effects. Therefore, only the contribution of the first effect, the  $\alpha$ -particles, is dealt with, and therefore the risk of DU considered very small.

DUO dust is treated as if it is totally insoluble. Solubility is not considered at all, so the toxicity of the other three effects can completely be neglected.

The impact of such a minimal interpretation can be found for instance in climate differences and the risk from re-suspension of DUOs in the environment. In Iraq the climate is very arid and dry, so the soluble component of the DUO particles in the environment do not get washed or weathered by the rain. Also DU has been found inside buildings, in Baghdad for example. Such DU particles still have their soluble component. In Dr. Baverstock's view, re-suspension is not so important in the much less arid climate of the Balkans, but is important in Iraq. An attack on a single tank might produce a few kilos of DU dust. The DU particles that have fallen to the ground become available for inhalation again and again, when blown by the wind or when vehicles pass.

#### *A deliberate 'blind eye'*

The issue of independence of the official institutions has to be questioned. The ICRP, the IAEA and the WHO continue to admit only part of the risk, apparently ignoring the evidence from the work at the Armed Forces Radiation Research Institute. Radiobiological protection regulation depends on models and there has been no attempt to update these models in the light of the new information.

What we have instead is a social judgement, that the risk in the context of the usefulness of DU is in fact an acceptable risk. This judgement is made on the behalf of those who are

exposed to the risk, not on behalf of those doing the regulating, of course. It is a choice to not interpret the new information, not to include it in one's calculations.

Dr. Baverstock cannot understand why the ICRP and the IAEA in 2003 could ignore the evidence which was available in 2000 and 2001, without incorporating it into their risk assessments. The position of the ICRP has to be to address the DU problem. The ICRP has to make a full risk assessment including the chemical toxicity and the synergistic effects, because at the moment radiation is treated separately from toxicity in their models. In the case of DU, a potential effect is missed by doing that. It has to be a deliberate 'blind eye', because these institutions have access to all the evidence.

### *Economical and political pressure*

There are thousands to hundreds of thousands of chemicals in use in modern society and very many different exposure modes to radiation and radioactivity. Epidemiological surveys of each of these risks would not be practicable, so regulation and the declaration that a chemical or exposure route to radiation or radioactivity is carcinogenic has mostly to be based on models.

There is no doubt that there is political pressure on organisations like the ICRP, IAEA and WHO. The member countries hold a key to this. For example, member states tell the UN to be free and independent, but only as long as it does what is required by them. And that is particularly true of the UK and the US. This political pressure is always 'understood', never explicit. Pressure is also applied through 'wheeling and dealing'. Dr. Baverstock is sure that in the case of the WHO, the then Director General, Mrs. Brundtland, was often faced with such a situation. In return for support in one aspect, less attention would be given to other aspects. Often it is a conflict between economic progress and the environment. This pressure, coming from the economic side, is driving the system off its course. Politicians should give real freedom to these organisations, instead of putting pressure on them. These institutions can only become independent if they are not pressured. Dr. Baverstock is sure that is the problem.

### **Other difficulties with proof**

#### *Acknowledgement of diverse symptoms*

There might be a situation in the long term in an environment where DU gets re-suspended into the air. Civilians could breathe large quantities of DUO dust. There is no agreement that the symptoms of people who have been exposed in this way are due to DU. There is a suspicion that symptoms are there because of exposure. That is the connection, but the problem is that the symptoms are often fairly diverse. No two people have exactly the same symptoms. Very different symptoms have been claimed, especially in the case of veterans who might have been heavily exposed: excessive tiredness, skin rashes, headaches and muscular weakness.

There is a very interesting parallel. Around twenty years ago in Spain, there was something known as the toxic oil syndrome. Evidently contaminated rape seed oil was sold and some 20,000 people suffered illness, some had very severe illnesses and 800 died. It was due to a toxicological response of some kind, but the toxin has never been nailed down. Even now, it is not exactly clear what symptoms are directly associated with the toxic oil syndrome as these symptoms were rather diverse.

#### *'Dilution' effect in epidemiology and statistics*

Exposure to DU can be very patchy where soldiers are concerned. It is possible that only some of the soldiers in an area could be exposed. If soldiers have died of cancer, it is not immediately clear how many of them were actually exposed to DU even if they were in the

vicinity where others were exposed. In the follow-up of such a mixed group the effect can be diluted by inclusion of people who have not actually been exposed.

This kind of dilution effect is a problem that often arises when measurements are done in a group. People who were nearby, but not actually exposed, lead to an underestimation of the result. This allows others to say: well, a few problems but not enough for action to be taken. Dr. Baverstock thinks that epidemiology often falls into this trap. It has often been convenient to look at a larger group than just those who were exposed and hence miss an important health effect. So, in examining groups one has to be very careful to select only those people who actually have been exposed.

The same problems with patchy exposure applies to a realistic environmental measurement. It has to be clear where the exposure is.

### *Laboratory conditions*

Urine measurements on DU have really to be made under laboratory conditions. If urine samples are taken in an environment which is contaminated with uranium, one will get high values in the samples, just from external contamination. In the Iraq situation, it will be very difficult to take realistic, biological samples. Depleted uranium would be found in the environment, therefore it is not really feasible to test in Iraq right now.

### *Credibility and stress*

If a message of concern is raised, the message has to be true. People become unnecessarily stressed if they believe they are living in a highly contaminated environment if indeed they are not. Their lives become very difficult. From the public health point of view, that is damaging.

### **Possible lines of action**

#### *The prevailing economic argument*

To be compensated for something, one usually has to show that there has been an exposure which has caused symptoms. It is not enough just to say that there has been an exposure. In the case of soldiers who come into contact with DU in cleaning up operations, the hazards are extremely high and compensation would be expensive. Compensation could be a factor driving the military authorities away from using DU. But also to completely discard equipment such as tanks and everything that was in them, is also a very expensive way of conducting business. There is the public concern and the concern of the soldiers themselves but the economic factors, rather than the humanitarian views, would seem to be more likely to influence the military authorities over the use of DU.

In the case of American veterans involved in nuclear testing in the Pacific, there is a list of thirteen cancers. If veterans have one of these thirteen cancers, and they have been in that area where weapons were detonated, then they are compensated, whether that cancer was actually caused by the radiation or not. The veterans are deemed to be in a compensatable position.

#### *Ask the right question*

A basic question for Dr. Baverstock is: what are we looking for proof of? Are we looking for proof that there is an effect, or are we looking for proof that there is not an effect? Because these are two completely different questions. Lawyers and politicians have to be very clear about this. He thinks that in the case of DU compensation, there is a kind of precedent that can be exploited by lawyers and politicians.

#### *Precautionary principle and a ban*

If a risk is suspected, or there is reasonable suspicion that there might be a risk, one is also supposed to apply the precautionary principle.

In the case of uranium weapons Dr. Baverstock believes that the precautionary principle would require cleaning up battlefields quickly after the battle, before the material spreads. The Geneva Convention states that civilians should not be at any health risk as a result of things left over from the battle. He believes that the Convention ought to include DU.

When the military are working to clean up they take full precautions. When the US military clean up a tank, full protective clothing for the skin and a breathing apparatus to prevent inhalation of the material is used. This is not required of the public living in the region where this material is deposited.

According to Dr. Baverstock a precautionary approach is definitely needed, but very costly. Actually abandoning DU would be a better solution. Costs are a realistic argument for a ban, and a ban may well be what will happen.

### *Independent research*

Out of a lot of issues mentioned, Dr. Baverstock liked the suggestion that the Socialist Party in the Netherlands might take up some kind of investigation on an independent basis. There is a fear that if one approaches two scientists and asks them the same question, this will result in two different answers. That is solved when these people are brought together in the same room and discuss the issue with one another. When Dr. Baverstock, for example, is put in the same room as people from the IAEA and the ICRP, he would ask why they do not use the actual data on chemical toxicity. They would have to give a very good reason which would ultimately be made public.

### *Empowering the military unions*

Dr. Baverstock thinks the military union is absolutely right to be concerned. He supposes that the union could negotiate, if not insist, on having proper measurements taken to protect military personnel where they may be exposed to DU.

## **PRESENTATION BY PROF. DR. MANFRED MOHR (Verbatim account)**

### *Introduction*

#### *The Draft Convention*

The DU Draft Convention was written by Prof Mohr and Mr. Samsel, a Polish law student. The issue of DU is about effects on health and environment, also about effects after the war has ended. Such poisons are forbidden as a basic principle of international law.

The rationale of such a Convention is to find a legal solution, which is a direct outcome of the precautionary principle. If there is proof that DU use leads to negative health consequences, then legal arguments can be applied by experts of International Humanitarian Law. In other words, if there is proof, then legal expertise can be added. In this sense, the draft treaty regime is meant to offer a method of legally covering the DU topic, and to be used as an argumentative and implementing mechanism.

There are more reasons why ICBUW, of which IALANA-Germany is a member, has adopted this document and is working on it. The text is also a basis for approaching politicians, experts and ministry officials. The Draft Convention offers a format for debate and evaluation of DU use, and can give substance to a more reasoned discussion. The Convention gives a certain weight to the groups in ICBUW, something to present and deal with.

#### *Moment of release*

The reason for releasing the Draft Convention at this time is explained in the introduction to the Executive Summary. Prof. Mohr thinks it is a good moment. There is a window of opportunity to start the debate on the Draft in political forums. The topic of uranium weapons is a relatively small disarmament issue, not to be compared with nuclear weapons, a subject where progress may take decades. For NGOs involved in disarmament, the 'small' DU Draft Convention may therefore be more interesting to take up.

#### *Arguments and resistance*

The DU Treaty is facing counter arguments, including from people within the anti-DU movement. They say, for example, that a treaty would not be needed, would be counterproductive or would never be signed or ratified by the US and the UK. Prof. Mohr states that if one accepts these arguments there would have never been an International Criminal Court in The Hague. A superpower like the US notoriously tries to block such processes and resists such ideas. The Ottawa process has also met a lot of resistance. The process started modestly with a Protocol to the UN Conventional Weapons Convention, then a Draft, and now there is the Ottawa Treaty regime as a basis for enlargement and implementation efforts. The same may take place with DU. Prof. Mohr expects that once the DU Treaty is open for signature, many parties may join and therefore create a dynamic. DU is a relatively small topic and there are a lot of arguments against its use. But there is good reason for the US to resist the idea of DU being proven illegal. If DU were to be declared illegal, persons that have used DU may be treated as war criminals. But even when superpowers resist joining the Treaty, it would still make sense to strive for a ban. A ban is also important for the many other countries that have DU in their arsenals. Banning simply means getting rid of this inhumane weapon, for which a treaty regime would be indispensable, based on, and existing in parallel to, the (customary) illegality of the use of such weaponry. Historic examples for such a re-enforcing relationship in point are the Biological and the Chemical Weapons Conventions.

## **The DU Draft Convention**

### *Preamble*

Just like all conventions, the DU Draft Convention starts with a preamble. A preamble is important from a legal point of view, it is part of a convention or treaty and in itself a legal text already. The preamble lists the basic legal principles which can be applied to declare DU use illegal.

The first such principle is the principle of protection of the civilian population against the effects of military hostilities. This reflects the philosophy of International Humanitarian Law, which makes a distinction between combatants and civilians. Combatants may fight and kill each other, but the civilian population should not be attacked at all because they do not add to enemy strength in a military sense. In the same vein, the 'hors de combat' soldier who cannot fight any longer has to be protected too.

The second principle is about the conditions in which attacked enemy soldiers die. The enemy should not suffer more than necessary. The famous Petersburg Declaration states that the only reason for war is to weaken the enemy. If this is achieved, warfare has to be stopped. Attacks have to be put to an end when someone surrenders, gets wounded or becomes sick. A third principle says that military necessity no longer counts. Even if a certain type of weaponry is very effective from the military point of view, but has harmful effects on civilians and soldiers, it may not be used.

Legal experts should discuss these principles in relation to prohibition of DU in more detail. The preamble ends with formulations regarding the help to victims of uranium weapons, their compensation and the removal of possible consequences by decontamination. The preamble finishes with the phrase to 'abolish uranium weapons from the earth'.

### *Articles*

The Draft Convention mentions that states have a general obligation to never use uranium weapons under any circumstances. There is a general obligation that uranium weapons may not be produced, developed nor traded. Nor may states assist other countries in using or dealing with uranium weapons. This obligation is limited to military purposes, to the military use of uranium weapons.

Uranium weapons should ultimately be destroyed. State parties have to report about the fulfilment of the Convention in this regard, which is normal procedure. In the end, DU should be transformed into the most stable, least dangerous form. A scientific model of such a procedure is needed for the proper formulation.

In the Draft Convention, also as part of the normal procedure, definitions and exceptions are formulated in the next articles. The definition of decontamination includes the important statement that user countries party to the Treaty are given five years to decontaminate. An exception under the Convention is covering civilian use of depleted uranium. ICBUW has yet to discuss the best ruling for civilian use with experts.

This next article includes rules on the identification of contaminated areas. These areas have to be marked to warn people. Information about contamination through the use of uranium weapons has to be provided to the Uranium Weapons Centre, set up, among other things, for that purpose.

Subsequently, there is an article about the need for international cooperation and support. Many affected states are not rich enough to cope with DU contamination. These countries need help from the international community of states, the United Nations or the Red Cross. This article also mentions the idea of having partnerships between affected states and other states. This special form of cooperation can provide help. A next step will be national implementation. Legal assistance needs to be implemented and legislation should be modelled to allow DU use to be treated as a crime.

The institutional structure of the DU Draft Convention is quite weak compared for instance with the Chemical Weapons Convention. The Chemical Weapons Convention relies on a huge institution, an organisation with great structural diversity. This article states that the Uranium

Weapons Draft Convention will start with a very small institution, the Uranium Weapons Centre. In the Uranium Weapons Centre experts collect information and data, but have no mandate to decide politically or legally.

A next rule is on funds. States and people need support, and voluntary funding is foreseen in this article. Then there is a quite usually structured set of articles on implementation, fact finding, clarification of issues and settlement of disputes.

A crucial next point is liability, a principle in International Humanitarian Law. Parties to the conflict are liable to pay compensation for violating the rules of International Humanitarian Law on all levels. Penal responsibility and civil responsibility are fixed in a special article. Liability extends to the area of decontamination and compensation of individual victims.

#### *The Draft Convention in different settings*

##### *The First Committee of the General Assembly*

Prof. Mohr thinks that in the setting of the United Nations General Assembly, the First Committee is the right place for the DU Draft Convention. The First Committee deals with political disarmament issues and has discussed the DU issue in terms of two draft resolutions. The first draft resolution in 2001 was adopted with a small majority of votes. The introduction in the plenary by Iraq resulted in extra resistance and the draft resolution was rejected. All NATO and 'First World' countries voted against. In 2002 the draft resolution failed in the First Committee of the General Assembly already, on a strong vote against. Prof. Mohr thinks though that it is worthwhile lobbying again. This lobby should be developed in parallel with other institutional settings like the Committee of the Conference on Disarmament in Geneva, though chances of getting the topic of DU being accepted are very low. Anyway, it would be important to have this lobby work being coordinated between ICBUW and the International Peace Bureau in Geneva.

##### *The Sub-Commission on Human Rights*

In the international or UN setting on DU, only the UN Sub-Commission on Human Rights has adopted two resolutions, in 1996 and 1997. These resolutions are non-binding, and at best soft law, but as yet form the only internationally recognised official statements on the illegality of DU. The resolutions relate the issue of uranium weapons both to human rights and/or to International Humanitarian Law. Some other aspects in these resolutions are also interesting and important for the discussion. The resolutions say that the production, sale and use are incompatible with international human rights and humanitarian law and declare that uranium weapons are weapons of mass destruction. The resolutions also deal with other weapons with indiscriminate effects, like cluster bombs and napalm, thus with a mixture of weaponry. After the adoption of the resolutions, the Sub-Commission continued to deal with the DU issue for some time, mainly through a Special Reporter, but with no further action taken.

##### *The European Union and the European Parliament*

Prof. Mohr sees the European Union as an important political setting. On the issue of DU, the European Parliament has adopted two resolutions, in January 2001 and February 2003.

Though the hype in the European media on the DU issue has disappeared since 2001, the discussion in the European Parliament continues. In 2003 the European Parliament called for a moratorium on the use of DU ammunition with many convincing arguments. The European Parliament was re-elected in 2004. In the political scenario of ICBUW, follow-up discussions in relevant committees would make much sense striving for the implementation of the 2003 resolution and its moratorium call, which obviously has been ignored completely. Against this background, ICBUW is organising a conference in Brussels in June 2005.

The Council of Europe also has adopted a resolution by the Parliamentary Assembly, in January 2001. This even goes a step further by calling for a ban on uranium weapons. Prof. Mohr believes that the Council of Europe route is not all that strong, but it provides another good opportunity to take up the DU issue again and continue with the discussion.

### *Other settings*

NATO sees no problem with DU ammunition and its use. In general, the approach of NATO is that everything is fine except maybe for some minor problems. But around 2001, there were hints that some problems might have occurred and measures had to be taken by the military. There was for example a problem with information for soldiers and how they should act in DU contaminated areas.

The formal link between the European Union and NATO - the EP Delegation for relations with the NATO Parliamentary Assembly - may take up the issue again and may investigate the matter further.

### *The International Red Cross*

Around 2001, the International Committee of the Red Cross (ICRC) did not see a possibility of prohibiting DU weaponry. Prof. Mohr had the impression that, at that time, DU was too much a political topic for the ICRC to take it up. What has been referred to was a specific procedure (under Additional Protocol I to the Geneva Conventions) prescribing that before one introduces a new type of weapon, the legal implications and possible violation of international law have to be checked. This type of procedure has been applied to the DU issue before by the US, as reported by Avril McDonald. Before using uranium weapons in the 1991 Gulf War a report stated that DU is problematic. A post-war report, maybe not surprisingly, says that everything is fine. The Red Cross is stressing the importance of this procedure, the results of which can be used as a legal argument.

Nowadays, the International Red Cross movement is more focused on issues like cluster bombs and explosive remnants of war or small arms. The 1980 UN Convention on Conventional Weapons (CWC) has separate protocols on incendiary weapons, landmines and explosive remnants of war (Protocol No. 5). The last mentioned protocol says that remnants have to be removed, warnings have to be given, cleaning up and marking has to be done, and so on. But as DU is not explosive, this protocol cannot be used with regard to DU. But there are similarities and overlapping areas and it should be possible to work for yet another protocol under the CWC model, entering into respective lobbying settings etc.

### **Other action in parallel**

#### *Awareness raising*

Prof. Mohr thinks that the effort to abolish DU works in parallels. In the current political climate, it seems impossible to implement the DU Draft Convention right away. Many low level solutions are needed to ultimately attain the outlawing or banning. The Ottawa process also has had parallels, as was the case with a protocol to the CWC.

An important example of a parallel is awareness-raising. Lawyers are fixed, interested when a text can be discussed. The Draft Convention put on the ICBUW website provides such a text.

#### *Court cases*

Lately, there have been some DU cases in Europe, for example in Scotland and Italy, that have not been really legal, or court cases. According to Prof. Mohr the given solutions are more or less ex-gratia kind of payments, a form of compensation that is not on a legal, or obligatory basis. Nevertheless, such cases deserve research and analysis, while human resources with regard to working in this and other legal and political areas are scarce.

An important court case ahead is the Richard David case pending at the UK Supreme Court. Richard David was poisoned with DU in the uranium industry. It took a lot of effort to prepare and pay for this case. It is a civil case, very interesting from a legal point of view. The case will give the first legal decision of some weight, in the highest court in the UK.

More international cases are needed, like that of Yugoslavia versus NATO countries case in the International Court of Justice (which has been dismissed because of declared non-competence on the part of the Court). The item was the use of DU in the air campaign at that time. But (also) in the setting of the International Criminal Tribunal for Yugoslavia there was a decision against starting proceedings. The special preparatory committee set up under Ms. Del Ponte dealt with the DU issue among many others, deciding in the end that the issue was not clear, but that DU use probably was legal.

#### *Legal workshop on the Draft Convention*

Prof. Mohr would like to invite more experts to discuss the draft text from a legal point of view. A workshop should be organised on the subject dealing also with questions of the correct negotiating fora, of processes inside or outside the United Nations, the Ottawa and CWC examples etc. In short, the discussion on DU should be universal, not limited to, or led by Europe.

#### *Tungsten*

In another parallel process, perhaps some years from now, the big powers could announce the renunciation of DU. The military could switch to alternatives like tungsten. At an early stage the German Bundeswehr dropped the idea of using DU, while there are also indications that the UK military is considering stepping out. But tungsten is more expensive and also problematic from a health point of view. In the case of renunciation there would no longer be any subject for a legal and political fight, because DU will not be used anymore. But for the DU that is still there, in the contaminated areas, for the (long-term) consequences of past DU use, the Convention will still be relevant. That also applies to countries that may be attracted to start using DU, as it is so cheap and effective.

## **PRESENTATION BY MR. WIM VAN DEN BURG (Verbatim account)**

### *Dutch soldiers*

The former Minister of Foreign Affairs of the United States Henry Kissinger said once:

<< Military men are just dumb, stupid animals to be used as pawns in foreign policy. >>

For me it is very clear that until that moment he probably never had met the Dutch soldier. Dutch soldiers are not only professional, they are smart, they have their own opinion and they feel responsible. They feel responsibility for the society in which they are living or acting. It is no coincidence that the history of the Dutch associations for military personnel dates back to 1898, when the first association for non-commissioned officers of the army was founded. They understood very well that they could serve their own interests only when they were organised.

### *AFMP/FNV*

In the past 105 years the AFMP/FNV has been transformed to a modern trade union for military personnel. In the beginning the subjects of deliberation with the Ministry were limited to labour and working conditions and the general lines of policy in relation to career possibilities. Nowadays the situation is that almost all subjects can be discussed, not only military subjects, but also subjects like health, safety, environment and so on. The associations for military personnel are fully accepted in the Netherlands, not only accepted by the military leadership and the politicians, but also embedded in society. Especially the developments over the past 15 years have greatly contributed to this embedding. AFMP/FNV joined the largest of one of the three federations of Dutch trade unions called FNV. As a result of that AFMP/FNV is a member of the European Trade Union Corporation, the ETUC. And last but certainly not least, AFMP/FNV is a member of EUROMIL, the largest European platform for associations of military personnel. At present EUROMIL counts 43 members, associations from 21 countries, representing nearly 500,000 soldiers. The opinions of the trade unions for military personnel are important and have a substantial influence on the public opinion of all members that are connected with military actions. By joining the FNV and EUROMIL, the AFMP/FNV became an association that takes care of more than just labour and working conditions for military personnel. Policy and activities are based on two fundamental concepts: employment and income. These are two very broad terms which cover a wide spectrum of different aspects. Consequently the AFMP/FNV takes clear standpoints about issues which are indirectly concerned with these areas, such as the environment, health care, discrimination and so on. It is therefore not strange that the AFMP/FNV is also intervening in the discussion about the military use of DU.

### *Diseased soldiers, the trade union, the Ministry of Defence and NATO*

For the AFMP/FNV it is clear that DU is a serious problem for soldiers, civilians and the environment. The first time the AFMP/FNV was confronted with mysterious illness of their members was in 1996. The union received several letters in which the connection between illnesses and contact with DU was suggested. It became a subject of deliberation with the Ministry of Defence, however with no final conclusion or result. At the beginning of 2000, the issue was once again discussed in our association, due to a report of the Belgian military trade union ACPM-CGPM. Belgian soldiers, who had joined UN operations in Bosnia, reported symptoms of mysterious illnesses. A member of AFMP/FNV, a UN peace keeper who also had served in Bosnia, reported leukaemia. Further examination came up with a group of 6 AFMP/FNV members who had already died due to different kinds of cancers. In this period, between autumn 2000 and the beginning of 2001, AFMP/FNV received reports from EUROMIL about symptoms and illnesses of twenty-five soldiers from several nations, such as Spain, Portugal and Italy.

The outcome of regular deliberation with the Ministry of Defence was that there was no proof of a connection between leukaemia and contamination with DU. The deputy minister of

defence sent a letter to parliament about the subject, and the parliament responded with a request for further studies by NATO. NATO responded quickly, and reported in January 2001 that there was indeed no connection between cancer and contamination with DU.

### *Worry if the ICRP and allies are independent and open*

The reassuring words of NATO do not mean that the concerns and distrust of the AFMP/FNV about the danger of DU are gone. DU is a heavy metal which is radioactive and toxic, and therefore dangerous. In the opinion of Mr. van den Burg the question is not if DU is dangerous, but how dangerous. And especially how dangerous in the long term. There are increasing worries about radiation effects and environmental damage caused by DU, because of the mysterious illnesses and post-war birth defects reported among Gulf War veterans, Iraqi civilians and UN peacekeepers serving in Yugoslavia. Because of this worry the AFMP/FNV follows the outcome of studies and discussions about DU with great interest. Mr. van den Burg is worried even more by the outcome of the research of Dr. Baverstock, though it is difficult for a non-scientist to judge its exact value. He finds it significant that lawyers and scientists question the judgements of organisations like the ICRP, when it comes to the effects of DUO dust. For Mr. van den Burg it is questionable if those organisations are tough and independent enough to face strong political pressure, when the outcome of scientific research is politically complicated. He is not sure that in all cases the answer is yes. Separately there is of course also the discussion between scientists who do not agree about the health risks of DU. The trade union does not interfere in that discussion because the union is not qualified to do so. Furthermore it has been observed that already too many people with no, or not enough knowledge interfere in the discussion, with more confusion as a result. However, it would not be wise to ignore the results of scientific research about DU, because scientists do not agree. Is it not a fact of life that scientists often disagree about methods and results of research? DUO dust has no natural analogue, and so the pragmatic solution of assessing the risk in relation to existing natural exposure is not available. That means in Mr. van den Burg's opinion that the viewpoint of the ICRP about DUO dust is at least premature. The contamination with DUO dust presents a serious potential hazard to health. The Dutch armed forces do not have weapons with DU, however Dutch soldiers are more and more confronted with the risks of DU because they have joined operations with the allies in Afghanistan, the former Yugoslavia and Iraq. It is of course known that the United States and the United Kingdom have those weapons and have used them. It is frightening but certain, that one cannot always trust the information of our allies. This was explained in Al Muthanna by the Dutch Minister of Defence, Henk Kamp, after he was incorrectly and incompletely informed by his American colleague about the presence of DU in Al Muthanna.

### *The AFMP/FNV wants to ban the use of DU*

Dr. Baverstock has explained that a precautionary approach, banning DU weapons, making thorough clean-ups is strongly supported by the available evidence. Mr. van den Burg's conclusion is also clear: first of all the military use of DU weapons must be banned. There is a possibility of finding substitutes for DU. Furthermore a thorough clean up is necessary to meet public concerns, however cleaning up will be a hell of a job. In his lecture 'science, politics and ethics' in the low dose debate, Dr. Keith Baverstock said in his introduction: "a life without any risk whatsoever would be a boring one, and some would say totally uncharacteristic of human nature. So one must accept that risk is a part of life, but how much, or what nature or how costs are important issues not to be dismissed lightly". Mr. van den Burg is sure that Dr. Baverstock met a Dutch soldier before he said that. So Mr. van den Burg chooses for Baverstock and not for Kissinger.

## **PRESENTATION BY MISS KRISTA VAN VELZEN (Verbatim account)**

### *Depleted uranium in Dutch politics*

Miss van Velzen has worked as a Member of the Dutch Parliament for 5.5 years, the same period as is covered in her memory on the subject of DU. She has seen a changing point of view in the government. The Dutch government used to say that there was no proof against depleted uranium and it was a subject not worth discussing. The Socialist Party has always been very critical about all military interventions. Although her party usually loses the debate and in most instances the military action will be agreed upon and will take place, Miss van Velzen has no intention of sitting back and waiting for proof. A critical discussion in parliament and with the government about DU and the military personnel and the civilians involved was possible. There have been good results. The government has changed its intentions. Nowadays, the government is even calling for a temporary ban, a moratorium, even though there is still controversy on the scientific value of the proof that has been offered. Parliamentarians have received reports from the Dutch government that both at UN and NATO level there has never been consensus on how to deal with DU. Miss van Velzen does not know if the Dutch government investigates the viewpoints of other countries, or moderates a discussion. In autumn 2004, the Dutch government promised parliament it would come up with some proposals. It was heard from insiders that only five words were said on this proposal. It was assumed right away that there was no consensus - and lunch break started. According to Miss van Velzen it is impossible to get a clue about what is really happening at government level, she can only hope that the discussion is done in a proper way. Miss van Velzen poses a highly theoretical idea: because the Netherlands often joins international interventions, and is a small but rich country, a ban of DU could be a condition for joining a next intervention. However, it cannot be expected that any NATO country would do such a thing. What can be expected is the cooperation of the Netherlands with other European countries, or NATO members, to call for a ban of uranium weapons.

### *The precautionary principle and the ban*

As a politician it is a difficult to decide whether there is enough proof to say that the precautionary principle should be applied. Proof of different points of view is backed up by different scientists, and therefore the relationship of politicians with scientists is a problematic one. Maybe it has always been like that, and perhaps the discussion on depleted uranium is no exception. In the debate on whether to drill for gas in the Waddenzee, a nature preserve, questions were asked about the risk for nature itself, and whether or not this would lower the sea bottom. For both opinions, no risk or a tremendous risk, the stacks of reports with proof had the same height. Miss van Velzen thinks that the precautionary principle is often used as a political tool, and as a politician, she cannot deal with the principle, nor rely on it. Miss van Velzen thinks it is going to take much work to convince governments to work with the Draft Convention. The Socialist Party in the Netherlands has worked for over 25 years on the case of asbestos, which was used in construction materials. Asbestos is not specifically a military subject, but there are many parallels with DU. Asbestos is seen as a slow and silent killer, and has long been ignored as a serious health risk too. Only after a long struggle by NGOs, lawyers and victims, asbestos was finally banned in most western countries, at least. Secondly, which country should take the lead to state that DU is dangerous? Currently, every individual European NATO country says that there is not enough scientific proof. Since Miss van Velzen believes DU is dangerous, she thinks that the Netherlands might be a candidate. The Netherlands is a country that does not possess uranium weapons. The main political reason not to do this is pressure from the US, but that is a reality for most countries.

### *Compensation*

Miss van Velzen has the idea that the governments of different NATO member countries still look at the DU issue as a short-term problem. Soldiers are maybe tested a day or a week after

exposure, but the long term perspective has not been looked at. She fears that the long term perspective will be similar to the asbestos case. That means not only a risk for military personnel, but also a risk to the national finances. It has to be expected that in twenty-five years from now, soldiers who have been in Iraq or Afghanistan or in wars yet to come, will claim money from the government because this issue was not seriously looked at. If research remains neglected in the future, financial compensation for diminished health and disease will be claimed.

Politicians should be more serious about DU, and should not be egoistic about the financial question. For Miss van Velzen it remains a question who is responsible for cleaning up the DU in Iraq, after having been used by the US and the UK military. Her questions to the Dutch government often remain unanswered, or address a different subject to that of the question asked. The reply on this particular question was that the Iraqi government is the only responsible institution, which seems to her a very strange interpretation of international law. The financial argument is realistic and therefore the court cases that have been won recently in the UK and Italy are very interesting from a political point of view. Veterans were compensated financially for their medical concerns. She has posted a question to the Dutch government whether these courts have accepted the link between DU and the medical situation of these soldiers, and whether that is enough proof to look into the subject again. The government responded that its position is never determined by foreign jurisprudence. However, the legal implications such as legal grounds and legal weight, should be studied and applied. If these implications can be used, such court cases should even be encouraged in different European countries and probably in the US as well. To Miss van Velzen the compensation scenario is a promising one.

## CONCLUSIONS

### *The precautionary principle*

The precautionary principle states that a chemical should be used with caution or not at all if a health risk is suspected or there is reasonable suspicion that there might be a risk. In the case of DU, a precautionary approach is strongly supported by the available evidence.

The US military applies this principle when it takes full precautionary measures in order to protect its troops when they clean up a battle-field, as in Iraq. However, in such a setting, the principle is not applied to civilians who live in the region where this material is deposited.

The precautionary principle is like a tool, it gives a direction. In politics the principle is often used as a political tool, with proof of opposite points of view backed up by different scientists. Therefore for politicians it is hard to deal with the principle, or to rely on it. Nevertheless, on the ground of the toxicity of DU a precautionary approach is very much recommended.

### *The Draft Convention*

The precautionary principle as presented here is essentially part of environmental law but it is also reflected in other areas of law such as international humanitarian law: 'precautions in attack', and very much relevant for the DU issue, the review procedure under Additional Protocol I to the Geneva Conventions with regard to new weapons. Based on the illegality of the use of DU weapons the ICBUW Draft Convention on the Ban of DU can be conceived as a direct and less costly consequence of the precautionary principle which also forms the rationale behind the EU/EP call for a moratorium which has so far been ignored. In the sense of precaution and illegality, reference can be made to other possible legal and political approaches like the human rights one, or the 'remnants of war' perspective. Altogether, ICBUW strives to set in motion legal and political processes on various levels, and in various forms, that ultimately turn the application of the precautionary principle into a total ban, i.e. the outlawing and abolition of DU weaponry (for which a corresponding treaty regime remains indispensable).

### **The burden of proof**

To prove unequivocally and for all time, that a specific kind of exposure is without risk is impossible. On the other hand it can be extremely difficult to prove the connection between exposure to an agent and disease as unequivocally a result of such an exposure. This is especially the case where the diseases concerned only occur after the lapse of considerable time (years to decades) after the exposure. Such diseases include cancer and hereditary disease. For these conditions causality is usually only accepted as proven where substantial epidemiological studies show clear causal attributes such as a positive dose response. However, the precautionary principle requires that action should be taken in the absence of conclusive proof, if there is a reasonable expectation of a hazard. Evidence that might indicate a hazard to the health of man may be obtained from animal studies or from laboratory cell culture studies. In cell cultures, exposure of cells to depleted uranium in soluble and insoluble forms has resulted in cells acquiring characteristics commonly associated with malignancy. Such cell culture tests were specifically designed to screen chemicals for their potential as carcinogens. Positive results in such tests should be and in practice are, taken as serious indicators of a hazard. Furthermore, US veterans with embedded depleted uranium (thus known to be exposed) and with high concentrations of uranium in their urine, have exhibited an excess of mutations in peripheral blood cells. This is a strong indication of a hazard to health.

Supporters of the use of DU often state that there is not enough etiological and epidemiological evidence against its use. Since nearly all ICRP regulations for alike chemicals are based on models, this seems not a realistic demand. Lawyers and politicians may find precedents for compensation in toxicological regulations of analogue chemicals.

## **The ICRP**

The International Commission on Radiological Protection (ICRP) is the body responsible for recommending standards to protect human health against exposure to radiation and radioactivity. Its recommendations are followed by most countries. Its primary recommendations give advice on the principles of protection and annual limits to doses of radiation for workers and the public. The secondary recommendations give annual limits to intakes of radioactive material which are in compliance with the recommended dose limits. The secondary recommendations are primarily based on models of the behavior of the different chemical forms of radioactive materials in the human body.

In 2003 the ICRP issued informal advice on the application of its recommendations to depleted uranium oxide dusts (Valentin, J and Fry, F., (2003), *Journal of Environmental Radioactivity* 64, 89-92). In this advice no attention was paid to the evidence of a chemical toxicity which had emerged since 1999. Thus, the potential for synergy between radiation and chemical toxicities were not considered either. Neither was the potential for an effect mediated by the bystander effect (identified first in 1992 and now well established) considered. In consequence, the ICRP regards depleted uranium oxide derived from impacted munitions as presenting a similar, or lesser, hazard as that caused by insoluble natural uranium oxides. This may be a significant underestimation of the true risk.

The ICRP should be asked to reconsider its position on depleted uranium oxide dusts in the light of the evidence that has accrued since 1999.

## **PARTICIPANTS**

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Marleen Teugels; Investigative journalist

Marlies Verhoef; AFMP/FNV press officer

## Biography Dr. Keith Baverstock

### Employment

National Research Council of Canada Post-doctoral Fellow tenable at the Whiteshell Nuclear Research Laboratories, Pinawa, Manitoba; Science Research Council Postdoctoral Fellow at the Department of Chemistry, Nottingham University; 1971 to 1991, senior grade scientist at the Medical Research Council's Radiobiology Unit at Chilton, Oxfordshire.

1991 to 2003, Head of the Radiation Protection Division of the WHO (EURO). Currently based at Department of Environmental Sciences, University of Kuopio, Finland.

### Committee work

1976 to 1980	Secretary of the PIRC <sup>1</sup> Panel on Radiation Hazards after a Nuclear Attack
1982 to 1989	Secretary of the MRC <sup>2</sup> Committee on Effects of Ionising Radiation (CEIR) and its subcommittees
1983 to 1989	Member of the MRC/NRPB <sup>3</sup> Joint Committee on Radiological Protection (JCRP)
1984 to 1987	Member of the Scientific Programme Committee of the 8 <sup>th</sup> International Congress on Radiation Research
1989 to 1995	Member of the international oversight committee for the Nationwide Radiological Survey of the Marshall Islands
1991 to 1995	Chairman of the Scientific Management Team of Rongelap Rehabilitation Project in the Marshall Islands
1997 to 1999	Member of the Scientific Programme Committee of the 11 <sup>th</sup> International Congress on Radiation Research
1997 to 1998	Member of the NAS/IOM <sup>4</sup> Committee on Exposure of the American People to I-131 from the Nevada Bomb Tests
October 1995	Participation in the BBC Horizon Documentary on Chernobyl Accident
1987 to 1991	Visiting research worker at the Institute of Physical and Chemical Sciences (RIKEN), Japan
2001 July/August	Member of the UN mission 'Human consequences of Chernobyl 15 years after'
2003	Member of the UK Committee on Radioactive Waste Management (CoRWM)

<sup>1</sup> US President's Information Technology Revolution Advisory Committee

<sup>2</sup> UK Medical Research Council

<sup>3</sup> UK Nuclear Radiation Protection Board

<sup>4</sup> US National Academy of Sciences / Institute of Medicines

**Biography Prof. Dr. Manfred Mohr**

born 1948	
1968 to 1972	Studied Law at Humboldt University, Berlin
1975	Dr. jur., Humboldt University
1987	Professor of Public International Law (Academy of Sciences)
(since) 1975	Various study visits, conference activities, organisational posts, research projects, etc. (Hague Academy, UN system, Council of Europe, OSCE and others)
1994-2003	Coordinator / Lecturer of Summer Course on International Humanitarian Law (with participation of the ICRC)
(since) 1997	Legal expert / Consultant / Project Coordinator for the German Red Cross (International Humanitarian Law; Refugees etc.)
since 2003	Officer for EU affairs, German Red Cross

*Main topics of research, publications and lecturing:*

- State responsibility/implementation of international legal norms
- International crimes
- International Criminal Law/International Tribunals and Courts
- Fact-finding procedures
- International human rights protection, with special emphasis on social rights and procedural questions
- Disarmament Law/Prohibited weapons
- Refugees, asylum, migrants rights
- Right to self-determination, minority protection, non-discrimination

*Membership/positions (abbreviated list):*

- German Red Cross (member of the Special Committee on International Humanitarian Law; dissemination officer for the Berlin region)
- International Association of Lawyers Against Nuclear Arms (IALANA) (founding member; member of the Academic Council, board member of the German branch)
- German UN Association
- German Association of International Law