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**ANOTHER
LITTLE BAG
OF HORRORS**

**THE RISKS
AND
PROBLEMS
ASSOCIATED
WITH
DEPLETED
URANIUM
ARMOUR
PEIRCING
SHELLS**

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THE DEPLETED URANIUM ANTI-TANK SHELL PROBLEM

Note - Depleted Uranium (Uranium 238) has a 'half life' of 4,500 million years, which is longer than the earth has been in existence.

The first indications that the British government was developing and proposing to deploy Depleted Uranium (DU) ammunition for tanks was an item in the Independent in April 1990 of a leaked report by what were the Atomic Energy Authority research laboratories at Harwell.

This commented upon the possibility of risks to the users of this type of ammunition and to people having to work amongst the targets it had been used against.

This type of ammunition is used for piercing armour and knocking out armoured vehicles. The US used between 5,000 and 6,000 rounds in the Gulf War, fired from aircraft as well as from tanks. Britain was developing it for use with Challenger 2 tanks but modified the ammunition for use with the Challenger 1's in the Gulf War.

Between 1989 and 1992 Royal Ordnance imported 500,000 kilograms of DU from Nuclear Metals Inc, 2229 Main St, Concord Massachusetts, for "the manufacture of munitions". The person in charge of this was AC Carpenito. The DU was sent to plants in Wolverhampton and Chorley, Lancs. The export License was signed by Marvin Peterson who was Assistant Director for International Security in the US government.

The United States, Britain and France have used these in anger. Germany and Japan have tank guns which could use this ammunition. It is likely that Russia has them available. It is thought possible that Iran has developed a shell for the 120mm gun on their British built Chieftain tank.

WHAT IT DOES AND THE ALTERNATIVES

Depleted Uranium is one of the hardest metals known and is classified as low level nuclear waste. It is used in a type of armour piercing shell. Shaped something like a crossbow bolt, a solid piece of metal is fired from a tank or an aircraft. DU is also extremely heavy. When it hits the wall of a tank its kinetic energy turns to heat and the projectile goes through the softened armour plate. Because of the shape and the weight a great deal of energy can be concentrated on a very small space, the point of the shell, as it hits the tank wall. It then passes through the wall of the tank, scraping uranium dust off the side of the projectile in the process. This ignites and burns at a very high temperature, burning everything inside the tank including the people. Such is the intensity of the fire the bodies themselves catch fire. The remains of the tank or armoured car is then radioactive.

This ammunition was developed by the US in the 1980's as a replacement for Tungsten anti-armour shells. They take two basic forms, the first of which is a shell which explodes when it hits the outside of the armour plate the shockwave and heat it generates makes a blister form on the inside of the plate, some of the material from which is sent reverberating around the inside of the tank, presumably killing the people inside. The second type consists of a solid penetrator, some of which have an explosive charge behind them. Tungsten, which is slightly more dense than Uranium (but not in its alloy form) has been traditionally used for the penetrators. As the shell hits the armour plate the charge goes off forcing the penetrator through the armour plate. No charge is employed when a DU penetrator is used. This relies on some of its kinetic energy being converted to heat on impact and forcing its way through the softened metal.

Modern armour plate consists of a lamination of several layers of different material. One of the first to deploy this was Britain when they developed "Chobham" armour in the early 70's. The Soviet Union developed it at roughly the same time and the technology began to be developed to overcome this type of armour.

The latest armour the USA use in their large tanks has a layer of DU in it. Britain and the other European tank manufacturers use other material and have concentrated more on Explosive Reactive Armour, which consists of a package of explosive on the outside of the tank which explodes when hit. The force of the explosion dissipates some of the force of the incoming shell leaving it without enough energy to do what it was intended to do the job. Although the Russians are rumoured to have deployed tanks with DU in their armour there is no hard evidence for this. They have also developed ERA for their tanks.

The gun the US use on their new tank is similar to that developed for the German Leopard tank and the French Leclerc tank built by Giat. This means that US tank ammunition can be used by a number of other countries should they so wish. Britain developed a different gun for the Challenger and so had to develop their own ammunition. The DU rounds were developed by the United States with the top range of Soviet tanks in mind.

However, two things should be borne in mind.

i) The modern Soviet built tanks deployed by Iraq were not involved in the hostilities. The tanks in that conflict were largely older, lighter T55s. The Tungsten ammunition, which Royal Ordnance manufacture "is capable of penetrating the armour of most current Main Battle Tanks (MBTs)". Armoured Fighting Vehicles do not normally have the same thickness of armour plate as MBTs and are therefore more vulnerable to anti-armour weapons. This means it was not necessary for these rounds to be used in the Gulf. There were alternatives, which the British largely used.

ii) DU rounds are cheaper. The DU is reputed to be a waste product and therefore comes virtually free while Tungsten is extremely expensive.

It looks as though the US used these on a wide scale in the Gulf War because of their cost rather than their effectiveness - although they are effective. The cost however does not include resolving some of the long term problems they create.

Research has been carried out into Tungsten alloys which will make them equal DU in density. It is probable that DU will soon be superseded by Tungsten as the preferred material. But this will only happen if there are consistent objections to the use of DU so the cost advantage is outweighed by the political disadvantage.

SPECIAL DECONTAMINATION FACILITIES NEEDED

The US established a special unit in Barnwell County, South Carolina, to decontaminate some of their hardware. The Defence Consolidation Facility is run by Chemi-Nuclear Systems Inc and was set up to deal with a number of different types of contamination but it is clear that by far the greatest problem is the effects of DU.

Some of the tanks and other armoured vehicles the US had in the Gulf were hit by accident by their own side (7 tanks and 20 Bradley armoured vehicles). Some were deliberately disabled to prevent them falling into the hands of the Iraqis. The M1-A1 Abrams tank has a layer of DU as part of the armour plating. Understandably the US were reluctant to leave their tanks behind.

Apparently the weapons also become radioactive as a result of firing DU rounds, although this is more likely to happen to the aircraft guns than tank guns.

The US tanks and armoured vehicles too badly damaged to be salvaged are broken up, their parts crushed and sent to a land-fill site for low level nuclear waste run by the Department of Energy near the Savannah River.

No attempts are being made to deal with the radioactive remains of knocked out Iraqi, Saudi Arabian or Kuwaiti tanks.

No such decontamination unit has been established in this country.

DESERT STORM SYNDROME

A number of the service personnel involved in the Gulf War have reported strange illnesses with very serious symptoms. These included paralysis of the face, bleeding, high temperatures, kidney pains, weight loss, dizziness and stomach ache. There are a number of possible causes; radiation, toxic poisoning from Uranium, breathing fumes from burning oil wells, toxic poisoning from some of the explosives used, side effects of the vaccines given service personnel, a so far unknown virus or a cocktail of some or all of these factors.

A US environmental group, the NTCF, delivered a report to Congress on the 18th of March 1993 which made a link between the exposure of servicemen and women to DU and the illnesses they suffer. They also believe that people living near the 50 or so weapons manufacturing plants which could have produced these munitions may be affected.

The US government are far more open in dealing with these conditions, have set up a scheme to monitor the health of service personnel involved in the war and is attempting to treat the people affected. Britain, on the other hand, is being decidedly reluctant to admit to any responsibility for those affected. After being pressed by MPs with constituents suffering the symptoms of this Desert Storm Syndrome, Hanley, the minister responsible, said that if the people suffering from the disease can get a statement from their Doctor saying that there were no other possible causes then the MoD will look at their case.

Hanley also initially claimed that all the personnel involved in handling the DU shells were advised of the risks and of the safety precautions they were to take. After a number of service personnel pointed out that this was not the case the government had to apologise to the House of Commons. While US tank crews etc were given training the British tank crews and transport drivers were not even told there were any risks involved.

LONG TERM EFFECTS

Following the Gulf war the director of the Albert Schweitzer Institute was in Iraq assessing the problems there. He was apparently initially sceptical of the reports of high levels of leukaemia occurring amongst the population, partly because the Iraqi authorities were reluctant to release information. They appeared to wish to play down the story. While he was there he picked up a spent DU bullet and put it in his pocket intending to have it analyzed when he got it back to Germany. An amazingly stupid thing to do, one would think, but perhaps it was a measure of his scepticism of the reports. He was arrested at Berlin airport for carrying radioactive material, when he set off the airport security alarms. This indicates a number of things. i) Handling the material does not produce any immediate symptoms. ii) On the other hand it is either sufficiently radioactive or sufficiently toxic to set off the alarms in an airport security system. Low level radiation does have a harmful effect on people exposed over long periods of time.

A plant manufacturing this ammunition in New York State was closed in 1980 because of the level of nuclear emissions it was putting out. "It is likely that anyone living within a mile or two of the plant during the seven years it was active has many thousands of depleted uranium particles trapped in his or her lungs". Those are the words of Mr Dietz, a scientist who worked for the company running the plant near Albany NY for 28 years. John W Kolmer MD, a Pentagon spokesperson says of DU dust that "since this material is a source of ionizing radiation, the potential for carcinogenicity is real". That means it causes cancer. He goes on to say "The same holds true for Nephro-toxicity which, in most of the literature available to me seems to be the greater limiting healthpoint of concern, protection from which requires a much lower ambient concentration in drinking water or foodstuffs". In other words it is more likely to kill you because of its toxicity than because of its radiation effects. The US Veterans Journal Spotlight, reported a secret International Atomic Energy Authority report in 1991 as saying that 500,000 additional deaths amongst the civilian population are likely before the end of the century as a result of this material. The report, however, dealt only with the radiation effects and not the results of its toxicity.

The same report is quoted as saying that Iraq and Kuwait now have 50,000 tons of radioactive waste in terms of rubble and knocked out tanks.

According to Spotlight one of the reasons why the US is so keen to salvage their own knocked out tanks is that there is the possibility that the DU in the armour plate could one day be usable in nuclear weapons - although most authorities discount this as a possibility.

Another long term effect which has to be considered is the political effect on the states which are faced with this type of weaponry. In other words how is a country likely to react when it knows that one of its neighbours who it do not have good relations with has DU ammunition, or if it feels threatened by the US and Britain who have.

To develop the technology to produce such weapons requires a level of expertise in the use of uranium that is close to the type of technology used in the development of nuclear bombs. A country faced with a hostile neighbour which was developing the capacity to produce DU rounds would feel an imperative to develop them themselves and thus give them an impetus to develop nuclear weapons technology. The deployment and use of these weapons is, therefore, an incentive for other countries to develop nuclear weapons technology.

THE BRITISH GOVERNMENT'S RESPONSE

Senior British officers are quoted in the August 1993 issue of International Defence Review as saying that "no medical diagnosis had by then attributed any of these cases to the possible toxicity or alpha radiation effects of DU particles" and "in contrast to the US forces, British tank units had fired only 88 DU rounds". That is a bit like saying "Of course I was sober, everyone knows I am a tea-totaller and anyway I only had two pints" but it typifies the type of reaction the authorities in this country resort to when faced with a serious problem of this nature. First pretend it doesn't exist and then say it does not really affect us anyway.

In the mid 80's some peace campaigners cut their way into the test firing range at Eskmeals, near Barrow. They discovered DU in rabbit droppings and in soil samples they brought out. They also reported that the test firing had been against a building and that sprinklers had been rigged up to suppress any dust resulting. This suggests that the people responsible for testing the weapons were quite irresponsible. The water from the sprinklers would return to the water table which may well feed into the water supply for towns in the area.

Concern is now being expressed over the effects of thousands of DU shells fired at the Dundrennan test range in Kirkcubright. The MoD has again been obstructive and secretive in their response. Alex Smith, the MEP for the area, said that getting information out them on this issue has "been like pulling teeth". This type of response seems to be the norm for our government when dealing with the problems raised by the use of DU.

Douglas Hogg told the House of Commons that the risk to civilians in the Gulf states from the contaminated armoured vehicles was too small to justify their removal. That is an admission that a) there are risks and b) that Britain is not going to do anything about them. However, our Government is notorious for underestimating risks in the use of nuclear material. Bearing in mind the fact the US are taking the risk to their own service personnel seriously enough to establish special decontamination facilities, it is probable that the toxic and radiation risks to our population in the affected areas have been considerably underestimated. The IAEA, for instance, have estimated the risk as probably causing 500,000 additional deaths over a ten year period.

The government have admitted that precautions are required before and after the use of this type of ammunition and yet neither our tank crews nor the transport personnel received any training. They were not informed that there was a risk. We have no decontamination facilities for the vehicles involved which implies that no attempt is made to decontaminate them. Information from the US suggests that the guns used to fire these rounds become radioactive. This could happen even if they were used for practice only. It suggests that the MoD will continue using contaminated equipment.

The service personnel who dealt with DU and who are now suffering because of it have met a brick wall of opposition within the MoD and the government to any enquiry about their illness. That means that attempts to collate information and research the diseases which will result will be suppressed by the government.

So far our government's response has been obstructive, secretive and cavalier. It is possible that the test ranges are as polluted as the battlefields in Iraq, that the manufacturing facilities are releasing as much pollution as the plants in the US and that the equipment used is as contaminated as the guns used by the US.

There is no reason why British service personnel should respond differently to exposure to this material than their US counterparts yet there is a considerable difference in the way they are trained beforehand and treated afterwards. The least you can say of our government is that they are behaving extremely irresponsibly.

DU ROUNDS THE ONLY ONES BEING PRODUCED

According to a Press Association report on the 31st of August 1993 the only type of armour piercing shells now being made for the Challenger 2 tank are DU rounds.

CONCLUSION

Our government is reluctant to admit that this type of ammunition has any problems associated with it. Their track record on such matters is instinctively to hide the truth when it is embarrassing. Even if they are not trying to hide something, the information we have is strong enough to say these shells should not be deployed and the ones we have scrapped.

DU shells are reputed to be the best there are at penetrating armour plate. But that in itself does not necessarily produce any significant military advantage. Other shells are available which will perform the same task but which do not involve the environmental cost or the cost in human life which DU shells involve. Having a civilian die ten years after the battle produces no military advantage, and yet it is a factor which should be taken into account.

Tungsten armour piercing shells may not burn everyone in the tank to death, but they do stop tanks and they and they do not leave 40 tons of low level nuclear waste behind. Using DU shells in the Gulf War was, therefore, wholly unnecessary because the type of armoured vehicle the shells were used against could have been knocked out by Tungsten shells.

The cost advantage is only real when the real effects of the use of these shells is ignored. The extent to which our own and other military authorities will see DU as having a cost advantage will depend, therefore, on the campaign work which is carried out to highlight the hidden costs in civilian lives and in environmental damage.

The association, which these shells imply, with a sophisticated nuclear industry represents an incentive to develop such an industry. The continued development of this type of shell will mean that inevitably arms customers will begin to demand them for their own use. Developing and deploying them creates a demand which could become uncontrollable.

Given what is now clearly known about the effects of this type of weaponry there is a very strong case for:-

- i) Having DU ammunition and armour banned through international legislation.**
- ii) The service personnel already involved should have their health closely monitored and the information collated so that they can have an adequate medical response to their symptoms.**
- iii) Measures should be taken in conjunction with the US and the Gulf states to dispose of the radioactive material left in the area in the form of knocked out vehicles and rubble.**
- iv) Serious efforts should be made to monitor the health of the people in the region of the battlefields, and efforts made to treat them.**

DEPLETED URANIUM ROUNDS AND THE LAW

It is clear that the deployment and use of DU rounds is illegal according to international law. There are two problems with this. One is that international law has about the same authority as criminal law has in the West End of Newcastle. The other is the British government take about as much notice of the law as the average juvenile joy rider does of the Highway Code.

There is, however, a campaign to make the British Government take proper account of the law covering nuclear weapons and weapons of mass destruction - the World Court Project.

There are a number of areas of law which impinge on the deployment and use of DU rounds.

i) The Hague Convention IV of 1907, Article 22 states "The right of belligerent to adopt means of injuring the enemy is not unlimited".

ii) Ibid. Article 23, "...it is especially forbidden (e) To employ arms, projectiles, or material calculated to cause unnecessary suffering". 'Unnecessary suffering' in this context refers to suffering which has little or no military purpose.

iii) The Geneva Protocol of 1925 "Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilised world; Whereas the prohibition of such use has been declared in Treaties..." (including the Hague IV, Article 23)

Also according to Article 35 covering the 'Basic Rules: Methods and Means of Warfare' of the 1977 Geneva Protocol I Additional to the 1949 Geneva Conventions:

iv) Section 35:1, "In any armed conflict the right of the parties to the conflict to choose methods or means of warfare is not unlimited."

and

v) Section 35:1, "It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury and unnecessary suffering."

These formulations cover shells and armour and remove get-outs which claim that the material is not intended (calculated) to cause unnecessary suffering.

The Basic Rules Article continues:

vi) Section 35:3 "It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long term and severe damage to the natural environment".

Article 55 of the convention repeats this prohibition in the context of establishing a duty to take care to protect the environment from military impacts and reprisals "which may be expected to cause such damage and thereby to prejudice the health or survival of the population".

Development, Possession and Deployment:-

The Nuremberg Principles of 1945/51, which at the time Britain claimed were part of international law recognised by all civilised nations and directly enforceable by the courts of all nations, make it a 'crime against peace' to participate in plans and preparations to wage a war "in violation of international treaties" (Article 6a).

The 1977 Additional Protocol I (Article 36 - New Weapons) says "In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party (HCP) is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law..."

It is clear therefore that possessing DU shells breaks international law, even if they are never used in an actual armed conflict.