UN priorities for investigating uranium and other suspected illegal weapons in the Israel/Lebanon conflict. August 2006

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Summary

On 11 August 2006 the UN Human Rights Council (HRC) and other organisations called for UN investigation of suspected illegal weapons and other war crimes during the Israel / Lebanon conflict. Carbonised bodies and large fireballs indicate that Israeli forces may have used uranium bunker buster warheads or other weapons of indiscriminate effect. Suspected weapons and their hazards are described. Procedures for forensic investigation and priorities to protect Lebanese and international personnel are recommended.

Environmental radiation testing is an immediate priority in Lebanon and neighbouring countries. Previous UN post-conflict inspections in the Balkans, Afghanistan and Iraq were long delayed and prevented from analysing any bomb or missile targets for uranium. But increased uranium dust was measured in other countries e.g. in Hungary and in the UK. International support is needed to ensure fast and effective scientific investigations in Lebanon and to prevent delays or subversion of UN and any other environmental testing.

1. Context

The second special session of the UN Human Rights Council in Geneva debated a draft resolution regarding "The grave situation of human rights in Lebanon, caused by Israeli military operations" (1). Item 6 included the following proposals:

> **Decides to dispatch, urgently, a high level Inquiry Commission comprising relevant Human Rights Special Procedures, and experts of International Humanitarian Law, to:**
>
> **a) Investigate the systematic targeting and killings of civilians by Israel in Lebanon;**
>
> **b) Examine the types of weapons used by Israel and their conformity with the international law; and**
>
> **c) Assess the extent and deadly impact of Israeli attacks on human life, property, critical infrastructure and environment.**

The resolution was passed by 27 votes to 11. It was criticised for only addressing suspected war crimes committed by Israel for example:

- Amnesty International called on the Human Rights Council "to request that the UN Secretary-General establish a comprehensive, timely, independent, impartial and expert investigation into violations of international law by all parties to the current hostilities in Lebanon and Israel." (2)
- Human Rights Watch called "for the council to consider violations committed by both Israel and Hezbollah, based on extensive research documenting both parties' indiscriminate use of force against civilians." (3) reflecting studies of previous conflicts.

Investigation of known and suspected war crimes is essential to traumatised communities in both countries. But the questions about the **suspected use of illegal weapons** by the Israel Defence Force (IDF) arise from reports of unusual explosions and bizarre or extreme injuries in Lebanon, and untreatable injuries caused by IDF anti-personnel weapons recently in Gaza.

A major concern is that many of the larger guided bombs and missiles used by Israel were manufactured in the USA. These 'bunker buster' warheads are suspected of causing widespread uranium contamination from recent conflicts in the Balkans, Afghanistan and Iraq. 500 more guided weapons were supplied by the USA during the latest attacks. As a result Lebanon may face similar post-conflict health and environmental hazards as in Iraq in April 2003. Refer my report **Key issues for UN uranium testing in Iraq,** 10th April 2003 (4).

2. Briefing groups

These notes are written for:

- Citizens in Lebanon - including military, medical, rescue, construction and environmental research workers and Government policy makers.
- UN personnel in Lebanon including aid teams (OCHA), peacekeeping forces (UNIFIL), the HRC Inquiry Commission, UNEP environmental inspection teams and WHO health monitoring teams. Also UN Countries directly involved in providing personnel for UN operations in Lebanon e.g. France, Italy and many more.
- Other international aid, human rights and media organisations e.g. ICRC, HRW etc sending personnel to Lebanon (or to other current conflict zones where US guided weapons are being used e.g. Afghanistan and Iraq).
- Health and environmental organisations in neighbouring countries e.g. Israel, Jordan and Syria possibly contaminated by IDF bombing or supporting refugees from target areas.

NATO forces should be fully aware of most US and Israeli weapon systems but new warheads and their environmental effects are classified (secret). The French reconnaissance troops for UNIFIL who arrived in Lebanon on 19 August probably include environmental experts testing for radiation before more troops are deployed.

3. Targeting civilian communities

The targeting of civilian communities - regardless of the type of weapons used - contravenes Article 35 of the 1st Protocol of the Geneva Conventions (5). This issue is well recognised by UN personnel, human rights groups and other observers. Evidence of locations and civilian casualties are obvious and readily verifiable by inspection teams.

The general issue of deliberately targeting civilians with conventional weapons (item 6a of the draft resolution) is a serious and ongoing concern for communities in both Israel and Lebanon. Ideally for the UN investigation report to be respected as impartial it should investigate attacks on civilian locations by both the IDF and Hizballah.

Legal principles such as “proportionality” will be assessed by international human rights lawyers. In a practical sense UN investigating resources may need to be deployed in proportion to the number of locations targeted by bombs, missiles and other munitions used by both sides, and the number of casualties.

The alleged targeting of civilians may involve far more people if it is proved that the IDF has been using large uranium bombs or missiles. Such weapons would create contamination over large areas downwind of the original attacks - weapons of indiscriminate effect. This risk may be overlooked if UN observers are unaware of the need to monitor for uranium or other radioactive dust and radiation levels around bomb and missile targets, and downwind in air, soil and water.

Previous UN Environment Programme (UNEP) investigations into uranium contamination have been tightly restricted to weapons admitted by US and UK forces (i.e. anti-tank ammunition) and to targets approved by them. But significant increases in airborne radiation were measured in Greece and of airborne uranium dust in Hungary during the Balkans War. Major increases in uranium dust were measured in the UK following US bombing in Afghanistan and Iraq see Charts 1 and 2 on page 8.

Israel has not reported use of radiological weapons by Hizballah in their strikes on civilian areas but airborne radiation may have spread over northern Israel from targets in Lebanon. On 22nd August Friends of the Earth Middle East have requested that the UNEP should send a team to document “the consequences of the war on the shared environment of Israel and Lebanon” (6). Invisible uranium dust contamination may have spread farther than the very obvious oil pollution along the Mediterranean coast from IDF bombing of oil storage facilities.

4. Use of known and suspected illegal weapons

Weapons of mass destruction and weapons of indiscriminate effect are outlawed by Articles 35 and 55 of the 1st Protocol additional to the Geneva Convention (5). Inhumane weapons are also outlawed by the CCW (certain conventional weapons) or Inhumane Weapons convention (1980) (7).

In addition to conventional weapons (e.g. high explosive blast/fragmentation bombs, shells and missiles) recent reports from the Middle East indicate that IDF forces may be using the following systems with suspected illegal components. These may have toxic, incendiary, radioactive or enhanced mutilation effects:

a) **Anti-personnel weapons** e.g. APAM tank shells, cluster bombs, and potentially widespread use by either or both sides of landmines or other sub-munitions. IDF anti personnel weapons include plastic flechettes - razors invisible to X rays, and pyrophoric shrapnel that burns inside the victim - designed to deny medical treatment.

b) **HEAT weapons** - High Explosive Anti Tank weapons, mostly with shaped charge warheads. Include ground launched SPIKE anti tank missiles and air launched missiles e.g. Hellfire, Maverick. These are often used against military and civilian vehicles. Hizballah may also have used a US TOW missile against Israeli tanks.

c) **Armour piercing ammunition** - 20 mm from offshore Phalanx systems, 25 mm from apache helicopters, plus 105 & 120 mm tank penetrators for anti-tank operations.

d) **Specialised weapons** e.g. BLU 107 Durandal runway destruction missiles (hard target explosive penetrators) and graphite anti-power station weapons.

e) **Hard target defeat weapons** - small, medium & large guided weapons referred to as bunker busters. These include:

- guided missiles (e.g. 800 lb warhead in AGM 142 Hav Nap, 2000 lb in AGM 130, etc) and guided bombs (e.g. 2000 lb AUP116 in GBU24, & 2 ton AUP113 warheads in GBU28).

f) **Thermobaric -** heat and blast weapons - use fuel air, reactive metal (possibly uranium) and other novel explosives (NE) in warheads e.g. the 2000 lb BLU-118/B warhead, the Hellfire AGM 114N missile, and the infantry SMAW-NE combat tested in Iraq.

g) **Other unconventional weapons** developed by Israel may have been used in the latest conflict including the MTHEL - Mobile Tactical High Energy Laser - and the Carpet launcher for fuel air or chemical attacks. Both are ground based systems.

5. Suspected use and proliferation of Uranium weapons (Figure 1, page 9)

Soon after the Belgrade bombing in April 1999 there were reports of a major increase in airborne radiation in northern Greece and of uranium dust in Hungary. Several Spanish and Italian troops died a few months after working in heavily bombed areas in Kosovo. But the UNEP study of depleted uranium targets in the Balkans (2001) indicated that radiation was limited to a few metres. The UNEP study was delayed 16 months. Locations were tightly controlled by NATO and had been cleared before UNEP inspectors were allowed access.

The anomaly of airborne uranium dust far away from known DU ammunition targets stimulated research which revealed the development of a new generation of guided weapons. These new weapons use secret, high density bomb and missile warheads to penetrate underground bunkers, hardened concrete structures and tanks. These use tungsten or uranium alloys. Where powerful incendiary effects are required Uranium alloys (depleted or undepleted) are the obvious military option - until its human and environmental consequences are considered. These are described in two reports:

DU Weapons 2001-2002 - Mystery metal nightmare in Afghanistan. Eos. January 2002 139 pages (8). Online at www.eoslifework.co.uk/pdfs/DU012v12.pdf . A detailed analysis of the origins, design, tactical purpose and potential effects of known and suspected uranium weapons. It includes political, scientific and military sources, conclusions for further investigation and hazards of proliferation.

Uranium weapons 2001-2003 - Hazards of uranium weapons for Afghanistan & Iraq. October 2002, 44 pp. Online at www.eoslifework.co.uk/pdfs/u25.pdf . (9) This updated the first report for post-conflict health epidemics and undepleted uranium contamination evidence from Afghan civilians. It explained the need to widen research from DU (depleted uranium) to include the use and hazards of any kind of Uranium weapons (depleted or undepleted). This was acknowledged in the World Uranium weapons conference, 2003. The Appendix includes US Patents for hard target warheads (2000 lb & 1000 lb) specifying tungsten and depleted uranium options registered by Raytheon & Lockheed Martin.

These warnings were sent to the UK Government, members of the UN Security Council and EU MEPs in Brussels, together with warnings that they would be used in the expected attack on Iraq. The **EU Parliament** incorporated these warnings into its resolution of 12 February 2003 calling for a moratorium on the development and use of landmines and DU Ammunition to include "and other uranium warheads" (10).

The US Shock and Awe bombing in Iraq in March/April 2003 provided first visual evidence of the new generation of hard target bombs and missiles. The brilliant white flashes, large fireballs and cascade of burning metal fragments (not phosphorus) indicate a new generation of warheads. These features are consistent with the 5000C explosion temperatures reported for Uranium warheads (Liolios 1999) and extreme flash burns where casualties are carbonised. Compare these pictures from Baghdad in 2003 (left) and Beirut in 2006 (right):

Incendiary bunker buster bombs or missiles, Baghdad, March 2003. BBC/AFP.

Incendiary bunker buster bombs in Lebanon, August 2006. BBC(14); Indep.

6. Locating evidence of illegal weapons

Many different kinds of weapon have been used in the latest conflict and supplied from several countries. Legal and illegal materials (e.g. tungsten or uranium in large warheads, and copper or uranium in small shaped charges) may be used in different versions of the same weapons or on different targets. New technologies may also have been used e.g. high density explosives, chemicals, biological agents etc. In some cases troops (IDF or Hizbollah) may not have known exactly what kind of weapons they were using.

Official studies of post conflict areas are well documented by the UNEP but exclude any analysis of bomb and missile targets. Independent studies by people like Busby (11) and Weyman (12, 13) have investigated suspected use of uranium weapons with minimal resources but careful observation. Their notes may be useful for investigators in Lebanon.

Testing target locations and other sources for evidence of illegal weapons needs a combination of environmental and forensic science methods and other enquiries including:

a) general profiles of suspected uranium or other illegal weapons - design, expected target features and potential casualty symptoms. See Figure 1 and other Eos reports (4, 8, 9).

b) Maps and analysis of key locations where suspected weapons were used.

c) Visual inspection of target areas for evidence of warhead types.

d) Collection of casualty and health data for target locations.

e) Collection of eye witness reports and documentary evidence - particularly film and photographic reports of actual explosions and or resulting damage. For example see the video of the explosions in Beirut on page 4 from BBC TV news on 4 August (14).

f) Physical sampling of debris, shrapnel and other environmental samples (air, water, soil).

g) Biological sampling of autopsy material, casualty fluids etc.

h) Radiological testing of air, soil and water, and of damaged buildings, structures and vehicles. Uranium dust and radiation monitoring records should be checked globally.

i) Evidence about all weapon systems supplied to or used by the IDF and Hizballah in 2006 e.g. identifiable components and debris from targets, disclosure of specifications and materials by military and manufacturers to UN arms inspectors; munition contracts, stocks and combat records; and transport data such as US guided weapons shipments via UK.

7. Immediate priorities for health, safety, environment and legal action

Two weeks after the HRC resolution was passed it appears that the HRC Inquiry Commission has not yet started work in Lebanon. If illegal weapons have been used then evidence should be available in Lebanon and in media reports. But evidence is already being dispersed by military operations to clear UXO (unexploded ordnance) and by rescue and reconstruction operations. These operations may be extremely hazardous to personnel involved unless environmental testing is carried out before or during work that will disturb dust and debris.

The urgency and scale of full weapons and target inspections exceeds the UN HRC's resources. But immediate action is needed for the health and safety of Lebanese citizens and international personnel. Urgent action is also needed to establish the basis for future legal action - either for financial compensation or war crime prosecutions. Priorities include:

a) **Hazard assessment procedures** and **risk scenarios** for evaluating individual targets, neighbourhoods that have received multiple attacks, and larger areas (e.g. valleys and water catchments). Community services in Lebanon, Israel and Syria will already have emergency procedures. But risk scenarios need to be updated to include the suspected use of illegal weapon systems - from small sub-munitions to large bombs - that may leave toxic or radioactive contamination as ongoing hazards to communities.

Scenarios are important where hazard data is incomplete or deliberately concealed for military purposes. They involve considering several different levels of risk e.g. no new weapons, some new weapons, small uranium weapons, large uranium weapons etc. By considering a range of situations then professionals can consider optimistic and negative scenarios without causing additional anxiety in traumatised communities.

b) **Immediate contamination precautions** to protect civilians and troops from potentially toxic or radioactive dust and debris. These are needed for bomb and missile targets including vehicles. Doug Rokke developed safety procedures for operations in uranium contaminated areas (15). Groups at risk include local residents, medical, construction workers, UXO (Unexploded Ordnance) teams, weapons inspectors, and media personnel.

Precautions should include alpha, beta and gamma radiation testing, dust control, high quality dust masks (or positive pressure breathing apparatus). Drinking water and food supplies should be protected from ultra-fine airborne dust particles.

c) **Ongoing contamination precautions**: Health risks from inhaling uranium oxide dust are cumulative. Precautions are not possible when sites are first attacked. But if uranium, or other toxic or radioactive contamination is detected in combat zones it is important to minimise long term exposure. Cumulative exposure may be through airborne dust, contaminated water and food sources. Citizens and construction workers must be protected. Contaminated areas or equipment must be isolated. Ongoing monitoring and precautions are needed until full environmental testing has been completed.

d) **Suspected weapon & hazard briefings** for all UN teams involved in weapons inspection so they are aware of the full range of weapon hazards that may be involved **including suspected uranium weapons**. These will enable local specialists to update risk scenarios. Field briefings are needed for local personnel who may be recruited or assigned to assist in evidence gathering or UXO clearance.

e) **Prioritisation of targets** with the highest probability of illegal weapons use is necessary for the UN HRC Inquiry team to make effective studies. 4 or 5 targets for each type of suspected weapon should be sufficient for their initial report and to make a case for a full scale UN inquiry including UNEP, WHO and IAEA.

Highest priority should be inspection of the largest guided bomb and missile targets. They have the most tangible evidence and may represent up to 500 times higher contamination risks than recognised for DU (depleted uranium) ammunition. They have vital implications for post-conflict community health & safety precautions. Many of these large targets e.g. airport runways and bridges are already being cleared.

f) **Wider environmental sampling for uranium dust and other airborne radiation** should be commenced immediately across southern Lebanon, especially near or downwind of heavily bombed areas. High volume air sampling systems as used in the UK should be used (11 and example data in Charts 1 and 2 on page 8) plus chemical, isotopic and microscopic analysis of dust. Results must be published every month. UNEP can advise on uranium testing for soil and water if they are allowed to but excluded from their Iraq hot spots report (16). IAEA could help if they agree to full, quick disclosure of radiation data. Israel, Syria and Jordan may need to monitor contamination of the upper Jordan valley.

g) **Public health monitoring and reporting** is important for residents returning to areas attacked with new weapons and for refugees and casualties who may have been moved away from target areas. There are predictable public health hazards e.g. due to damage to water infrastructure. But unusual health epidemics may indicate use of toxic or radioactive munitions e.g. skin, respiratory, bleeding and gastric disorders, renal failure, rapid onset leukaemia, birth defects and longer term cancers. Post conflict health monitoring has been systematically disrupted in Iraq. This must not happen in Lebanon.

International personnel e.g. troops, aid and media personnel should also be monitored during assignments to combat regions and for at least 5 years after leaving. Medical repatriation data may give early warning of exposure to areas contaminated by toxic or radiological weapons.

h) **Commitment to making public all information about hazardous locations, including toxic or radioactive contamination, UXO and unstable structures, is essential.** Locations identified with radiation or other hazards should be marked immediately and isolated to protect adults and children. **Public health statistics (illnesses and deaths) plus environmental monitoring data (radiation and dust levels in air, soil and water) must also be reported for each area quickly and regularly - every week during the first year.** The Government could set these targets and require all international agencies to agree to them. The military use real-time health and environmental data in combat. The same technology is essential to protect post-conflict communities. It is vital to identify early onset and cumulative effects of illegal (CBR) weapons on civilians.

i) **Legal and scientific advice** may be needed to consider rules of evidence to ensure that forensic data and weapon specifications are suitable for legal compensation claims and possible war crime prosecutions.

8. Risks of interference in post-conflict investigations

Vigilance and international support is vital to protect the UN HRC Inquiry and other UN inspection projects in Lebanon from interference. This has occurred after military operations in the Balkans, Afghanistan and Iraq. This interference may include assignment of covert personnel, interference to conceal targets hit by illegal weapons or to exclude inspectors from them and removing or concealing evidence. It may also include pressure on witnesses, inspectors and laboratories to limit analysis and publication of evidence of illegal weapons.

The international media have a major role to monitor these hazards by publicising the HRC resolution, the activities of UN inspection teams and any attempts to block or delay their work.

In 2001 in the Balkans NATO excluded UNEP inspectors from testing bomb and missile locations by stating that the areas were unsafe due to UXO. On 23rd August 2006 the US Government offered "emergency aid to Lebanon to clear explosive objects of war" to extend its existing UXO operations in southern Lebanon.

If the US have genuine humanitarian concerns for citizens in Lebanon why did they supply 500 large guided weapons to Israel during the conflict? US ordnance specialists are valuable to help clear UXO in Lebanon. But some may be checking the performance of new weapons that have been combat tested by Israel for US and other arms manufacturers.

UN and other independent environmental inspection teams must be given access to target areas before, or together with, UXO teams. The international media should be allowed to witness these operations. Who can Lebanon trust?

9. Conclusions

The rapid proliferation of uranium and other unconventional weapons technology is rarely discussed in the UN or international media. The EU Parliament resolution in 2003 (10) and the UN HRC resolution of 11th August 2006 (1) are rare exceptions. Each new conflict is used as an opportunity for arms manufacturers to combat test new and upgraded weapons, and to dump obsolete weapons stock. Photos of carbonised bodies and other bizarre injuries and huge explosions in Lebanon (page 4) indicate that *Israeli forces have used unconventional weapons* similar to those used by US forces in the Balkans, Afghanistan and Iraq.

Many of these new munitions, from cluster bombs to large bombs and missiles, appear to be *weapons of indiscriminate effect*. If their warheads use any uranium then these are toxic and radiological weapons. Such weapons are *outlawed by the Geneva and CCW Conventions*.

UN inspection of suspected uranium and other illegal weapons used in the latest Israel / Lebanon conflict is essential and urgent. These may cause *immediate and long term health, safety and environmental hazards* for civilians and troops in Lebanon and possibly Israel, Syria and Jordan. All types of illegal weapons used in this conflict must be identified.

The most optimistic scenario is that no uranium weapons have been used in the Lebanon. But if any IDF hard target bombs and missiles used uranium ballast or liners then *parts of the Lebanon and other countries may have significant uranium oxide contamination*. Israel monitored Hizballah rockets for potential radioactive contamination but none was reported.

Rigorous international investigations are needed into the weapons used in Lebanon, their manufacturers and governments approving their trade and proliferation. This is the UN's fourth opportunity in 7 years to investigate the new generation of unconventional weapons and their combat use. If these include uranium warheads then their manufacture, trade and use are major breaches of international law. *Arms industry personnel and NATO governments already know the facts about these secret weapons and their contamination. Who will reveal the truth?* Will UN inspectors be allowed to ask these questions in the Lebanon, Israel, USA and UK?

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Eos uranium weapon studies are online at www.eoslifework.co.uk/Comindx.htm#afghdu

Charts 1 and 2: Airborne uranium dust levels monitored by the UK AWE, in and near Aldermarston, Berkshire, UK in 2001-2003

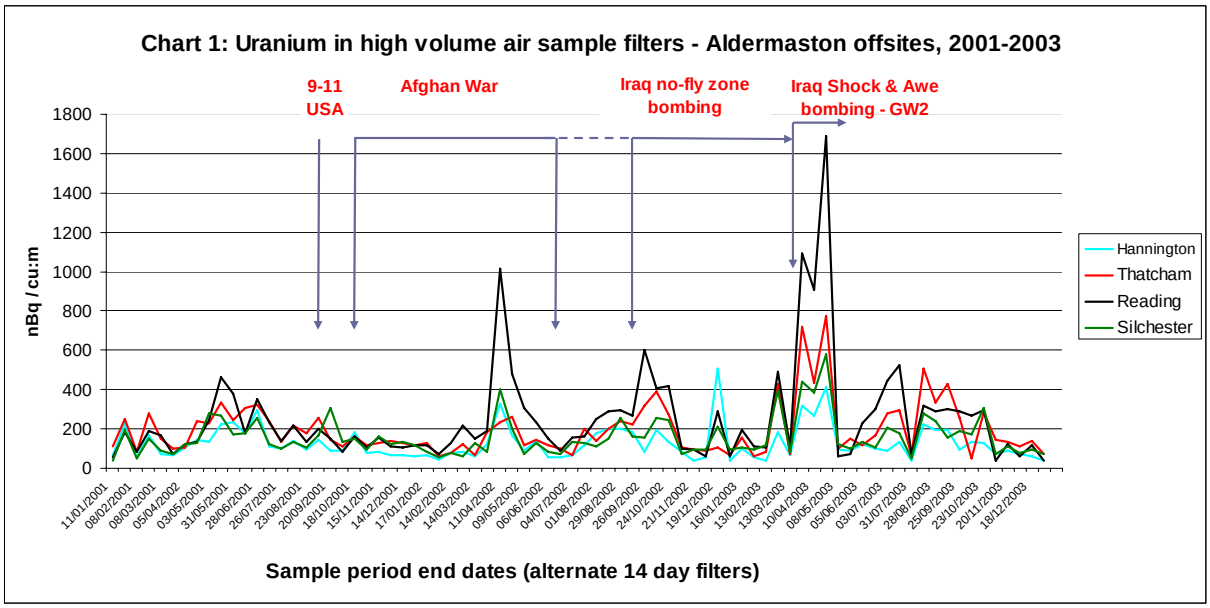
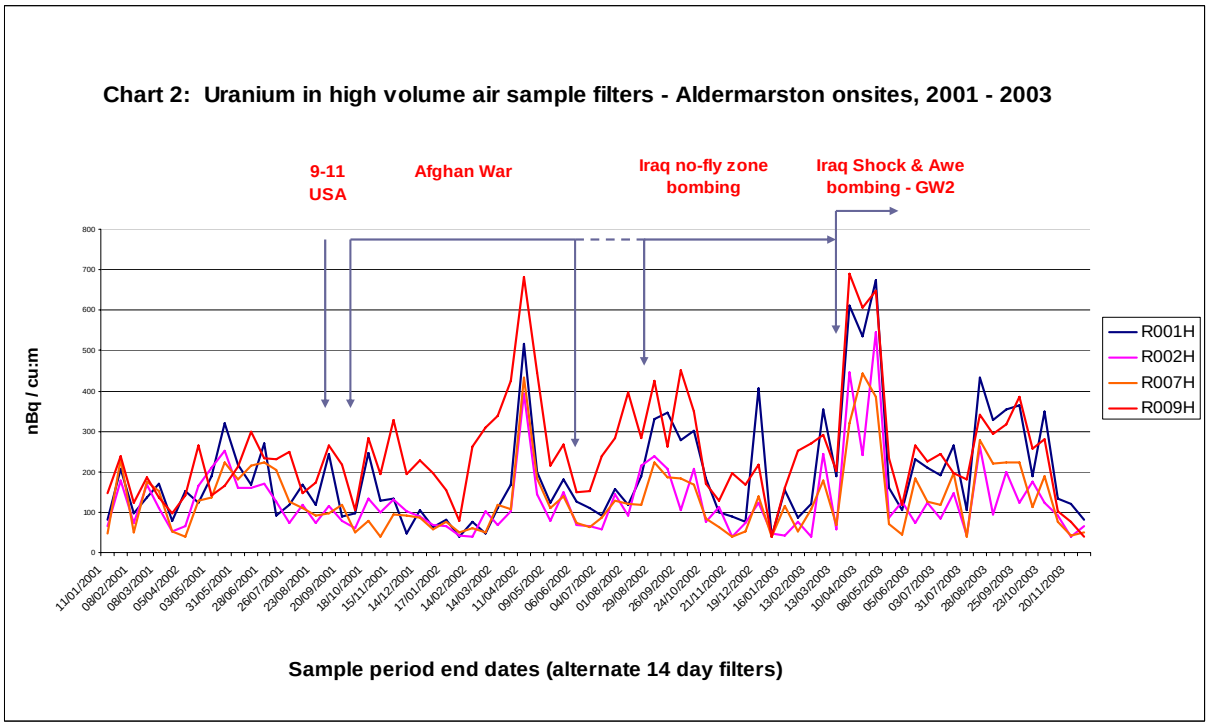


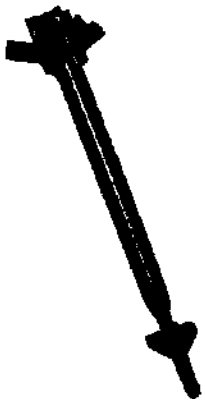
Chart 1 shows data from 4 civilian locations (offsites) 3 -10 km radius from AWE, Aldermarston.
Chart 2 shows data from 4 onsite location around the AWE complex.



1. Data supplied by UK Defence Procurement Agency, Source AWE (previously UK Atomic Weapons Establishment). Data is for Total Uranium, no isotopic analysis given.
2. Variations between different samplers reflect local conditions but show similar patterns between on and offsite locations. The highest levels indicate major increases in uranium dust levels detected at 8+ locations over 100 km2. This indicates widespread distribution - not due to AWE operations or other local sources.
3. Increased levels during March-April 2003 (Gulf War 2) correlate with periodic air flows across Europe to UK from heavily bombed areas in western, northern and central Iraq during US No Fly Zone and Shock and Awe bombing. These air / dust movements were tracked using NOAA Hysplit atmospheric modelling system. www.arl.noaa.gov
4. During October-Nov 2001 prevailing winds took dust from Afghanistan dust through South Asia, possibly washed out in monsoon rain. March/April 2002 high level winds track from Operation Anaconda & new thermobaric weapon tests in Gardez region, across China, Japan and USA to UK & Europe in 10 days.
   Analysis: C.Busby & S.Morgan (11). NOAA tracking & charts: D.Williams.

Figure 1: Hard target guided weapons in 2006: guided bombs & missiles with "dense metal" warheads. (Sources: FAS & Global Security, updated 2006)

Warhead weight

SMART or GUIDED BOMBS	kg	lbs	CRUISE, GUIDED & PORTABLE MISSILES
GBU-28, EGBU-28 & GBU-37) > 2 ton Bunker Busters (BLU-113 / AUP-113 / BLU-122) Advanced Unitary Penetrators 	2000	4400	
		4000	
	1500		
		3000	
	1000		
GBU-15, GBU-24, GBU 27, GBU-118/B GBU-31 JDAM > (BLU-116, BLU-109/B, BLU-110/B AUP-116 penetrators) 	900	2000	**AGM-130C** (boosted GBU-15 +AUP-116) < **AGM-118/B** (AUP-116 + TB fill)  **AGM-86D CALCM** (AUP3M 1200 lb) ↙  
		1200	
	500		**AGM-158** **BGM-109**
GBU-32 JDAM > (AUP) 		1000	< **JASSM** (AUP) **Tactical Tomahawk** (AUP)
		800	< **AGM-142** (I-800 AUP)
			↙ **Storm Shadow / SCALP-ER** (BR)
			↙ **AGM-154C JSOW** (BR)
	250	500	< **AGM-84 SLAM-ER**
Durandal Runway bombs >		300	< **AGM-65G Maverick** (S/CH)
SDB Small Diameter Bombs > (AUP)		250	< **Hellfire; Brimstone** (S/CH)
	100		" **AGM-114N** (TB)
A-10 strike 30mm x 200 rounds >	50	25	< **TOW 2 A/B** (S/CH);
		5	< **SPIKE**; **Javelin** (S/CH); **SMAU-NE** (TB)

Warhead weights include explosives (~20%) and casing. Dense metal ballast estimated 50-75% of weight. Tungsten or uranium alloys. **AUP** - Advanced penetrators. **S/CH** - Shaped Charge. **BR-** BROACH Multiple Warhead System (S/CH+AUP). **TB** = Thermobaric

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Photo credits: AFP from BBC website (2003, 2006). AP from The Independent (July, Aug 2006).