

# Crimes of the Century: Occupation & Contaminating Iraq with Depleted Uranium

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# CONTENT

1.0. Introduction .....	(p 2)
1.1. The invasion of Iraq .....	(p4)
2.0. Status of the Environment and Human Population under US Occupation (2003 – to date) .....	(p6)
3.0. Contamination of Iraq with Depleted Uranium .....	(p14)
4.0. Synergic Health Effects as a result of using DU weapons on starving, depressed population of Iraq .....	(p20)
4.1. Violations of Occupation to International Humanitarian Law .....	(p23)
5.0. Conclusions .....	(p24)
Cited Works .....	(p25)

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## 1.0 Introduction

After thirteen years of the devastation of an entire country through the implementation of the criminal economic sanctions that were imposed by the United States of America and the United Nations on Iraq, the US administration decided to invade Iraq.

Gulf War I and the destruction of Iraq's economy, education, health care system, and society through the continuous bombing and attacks of the illegal No Fly Zones, were all part of the plan to invade Iraq and take over one of the richest oil reserve countries in the Middle East region. Pirating Iraq's wealth is an advanced step to control and manipulate global economy.

New generations of conventional and banned weapons were used in the invasion of Iraq military operations from March 19<sup>th</sup> – April 9<sup>th</sup> of 2003. Table 1 shows some of the weapons that were used during the invasion and then, the continuous occupation of Iraq [1].

Other illegal weapons are cluster bombs & munitions [2], Napalm bombs [3], white phosphor [4] and Depleted Uranium weapons [5].

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<sup>1</sup> War on Iraq: weapons. [www.cnn.com/specials/2003/iraq/weapons/index.htm](http://www.cnn.com/specials/2003/iraq/weapons/index.htm)

**Table 1** Weapons used during military operations of Iraq's invasion and occupation [1]

<b>Munitions</b>	<b>Ground Weapons</b>
AGM 88	Up-armored Humvee
AGM 154A	M1A1 Abrams battle tank
SCUD C	M2A3 Bradley fighting vehicle
Tomahawk	M6 Bradley Linebacker
AGM 65	Humvee
MK-82	M109A6 Paladin Howitzer
AGM 84D	Saxon Armored personnel carrier
GBU 12	Scimitar reconnaissance vehicle
MOAB	SA-80 rifle
Hellfire air-to-surface missile	A590 Braveheart
TOW anti-armor missile	M270 multiple launch rocket system
Stinger anti-aircraft missile	Patriot missile system
Massive Ordnance Air Blast Bomb (MOAB)	Avenger Humvee
JDAM air-to-surface bomb	Light armored vehicle
JSOW air-to-surface bomb	M88A2 Hercules Recovery
GBU laser-guided bombs	US infantry weapons
GBU – 28/27 Bunker Buster	Challenger II battle tank
Daisy Cutter 15,000 lb bomb	Warrior combat vehicle
MK 82/ 500 lb bomb	Striker anti-armor vehicle
MK 84/ 2000 lb bomb	Sabre reconnaissance
Thermobonic weapon	Land rover light truck
Tomahawk / AGM, cruise missile	
Maverick air-to-surface missile	
HARM anti-radar missile	
AIM-120 air-to-air missile	

<sup>2</sup> Simon Helweg-Larsen, "Irregular Weapons Used against Iraq". ZNET <http://www.znet.org/welser.htm>, April 2003.

<sup>3</sup> Sarah Meyer "What Kind of Incendiary Bomb Was Used Against People in Iraq" <http://www.globalresearch.ca/index.php?context=va&aid=1226> November 14, 2005.

<sup>4</sup> Steven D. "US Army Admits Use of White Phosphorus as Weapon". Daily KOS.

<sup>5</sup> Scott Peterson Remains of Toxic Bullets Litter Iraq, May 18, 2003, Christian Science Monitor.

## 1.1 The invasion of Iraq

Military operations have resulted in the following environmental damages:

1. Nitrogen, Sulfur, Carbon oxides from explosions of conventional bombs and weapons.
2. Soot and Hydrocarbon plumes from burning thousands of barrels of oil from oil wells and pits surrounding Baghdad and other cities. Smoke and soot from burning crude petroleum generates toxic and carcinogenic [<sup>6</sup>] substances like polycyclic aromatic hydrocarbons or PAH's, dioxins, furan, Mercury and Sulfur. Black soot plumes covered Baghdad and other cities for more than weeks during the invasion operations.
3. Thermal heat and pollution as a result of using Napalm and other heat generating weapons.
4. Noise pollution from the "Shock and Awe" attack on the civilian population of the major Iraqi cities where noise intensity exceeded 130db, close to the threshold of pain to human beings.
5. Increase of total suspended solids (TSP) in the air due to the invading forces' heavy artilleries traffic & deep earth bombardment using Bunker Buster bombs and other earth penetrating missiles. Modeling dust storms during Gulf War 1, 1991 indicated an increase of the frequency of dust storms events from 10% of the days annually to 18% due to huge soil disturbance between Kuwait and Iraq [<sup>7</sup>].
6. Electromagnetic pollution from the use of laser guided missiles, radars and advanced electronic devises. Increase of electromagnetic energy in the atmosphere cause the ionization of the atmosphere. Ionization of atmosphere generates free oxygen radicals. Formation of these radicals can cause serious related diseases like anxiety, depression, and pregnancy problems. Higher rates of cardiovascular disease and Cancer were diagnosed in areas of early radar systems [<sup>8</sup>].
7. Ionized radiation from the use of Depleted Uranium weapons in highly populated areas like Baghdad, Smawa, Basra , and other cities as will be explained next section [<sup>9</sup>] [<sup>10</sup>].

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<sup>6</sup> Baghdad Fires Pose Health Risks, War in Iraq, UNEP, March 13, 2003.

<sup>7</sup> Draxler R. R., et al, "Estimating PM<sub>10</sub> Air concentrations from Dust storms in Iraq, Kuwait and Kingdom Saudi Arabia. Atmospheric Environment" vol35:4115-4330.

<sup>8</sup> Ammash, H,"Toxic Pollution, the Gulf War, and Sanctions". Iraq Under Siege. Edited by Anthony Arrove. South End Press. Cambridge Massachusetts, 2001.

<sup>9</sup> Nadeshda, 2004. The use of depleted Uranium. <http://www.nadeshda.org>

<sup>10</sup> Deadly waste returned to US Forces, Green Peace, June 24,2003

8. Surface and ground water pollution as a result of:
  - a. Fuel and toxic chemicals under storage tanks rupture as a result of bombing and explosions, looting of industrial complexes, and Iraqi military camps and bases.
  - b. Sewage water accumulation as a result of sewer network destruction. Sewage water percolated to shallow ground water then to nearby water courses.
  - c. Polluted rain storms and runoff as a result of dissolution of previously mentioned air pollutants.
  - d. Pathogen water pollution like cholera, typhoid, infectious habitats and malaria from all the sewage and polluted runoff inflow to rivers.
9. Land and soil degradation as a result of explosions and heavy artilleries traffic and sewage flooding of huge area's of Baghdad and other major cities in addition to the accumulation of garbage.
10. Contamination of Al-Tuwaitha (Iraqi Atomic Commission complex) where about 600 Tons of natural Uranium and Cobalt 60 containers were looted after spilling this radioactive waste on the ground of the complex and surrounding area's. Green peace radioactivity measurements of Tuwaitha village reached (1300-10,000) times natural background [10].
11. Radiological contamination of parts of Al-Jazeera high land of Mosul Uranium Extraction site. The looters took highly contaminated Uranium extraction instruments and destroyed the radioactive waste ponds causing serious ground water contamination in the area [11].



<sup>11</sup> Al-Azzawi, S. N. et al, "Environmental Damages of Military Operations During the Invasion of Iraq 2003" World International Tribunal, Istanbul, Turkey. June 2005

## 2.0 Status of the Environment and Human Population under US Occupation (2003 – to date)

After announcing the end of the Iraq's invasion military operations on May 1<sup>st</sup>, 2003, the occupation of Iraq by the United States of America became a reality. The international community was stunned by the cruelty of the event, and by the emergence of a modern day colonial era.

The occupation forces allowed, and in cases supervised, the destruction and looting of National Museums, civil service centers, governmental ministries, food ration storages, industrial complexes, mines, etc. as part of the invasion operation to create a state of chaos that allowed the invading forces to rearrange the situation in Iraq as if it were one of their video games.

Paul Bremer, the Bush administrations assigned Civil Governor dissolved the Iraqi Armed Forces and security forces in Iraq, allowing the country to spiral into violence and blood, as was planned by the Occupying forces.

The occupation-assigned government was selected to satisfy implementing the Washington DC pre-written new Iraqi constitution, to change the demographic structure of Iraq in order to take over its oil wealth.

Iraq's population is mainly composed of 80-85% Arabs and 15-20% Kurds [<sup>12</sup>]. In order to pull Iraq away from its surrounding Arabic environment, the occupier's constitution officially divided Arabs in Iraq into Shiia and Sunni sects, a division based on sect/religion- something the American constitution itself forbids to discriminate upon in America. The main reason behind this was to rely on and award the Kurdish and Iranian-descendent Shiia (non-Arab) to help the United States invading and conquering the country.

The American media kept repeating statements like 'Sunni Arabs' to create a misleading image and idea that the Arabs are not a majority, but only a minority in Iraq. If we take into consideration the constitutional religious and sectarian differences alone, the Sunnis (being Arabs and Kurds) would also constitute the majority in the country, the Kurds being 98% Sunni Muslims.

The occupation decided to adopt a (sectarian-ethnic) basis in the constitution to divide the country into three major parts (Northern Kurdistan region, Southern Shiia region and a Middle Sunni Region).

Changing the national identity of a country is not as easy as it seems. The USA and its local allies (Kurds and Iranian) have to commit a genocide against the Arab population (first the Sunni then the Shiia) to properly change the demography and nationality of Iraq as it has been

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<sup>12</sup> Encarta Online Encyclopedia 2008. <http://encarta.msn.com>.

planned in the Greater Middle East Project. Figure 1 shows the planned division of current countries in the Greater Middle Eastern Project [13].



Figure 1 Greater Middle Eastern Project [13]

A few weeks after announcing the end of Iraq's military invasion operations, Iraqi resistance of the occupation had already begun. The military resistance in Iraq is mainly comprised of anti-occupation civilians and some of the 600,000 unemployed former personnel of the Iraqi army and security forces, which were dissolved (personnel still fully equipped with their weapons). These Iraqi forces knew of locations of weapons ammunition stock piles that were distributed all over the country, pre-planned to be used in a Guerilla type Warfare in the case of occupation.

The American Administration not anticipating the ferocity of the resistance, decided to use what they call the previously prepared 'Terrorism and Al-Qaeda doctrine' to describe all types of occupation resistance in Iraq. According to which, they brutally attack and kill civilians, destroy villages, cities and any place that assists and/or sympathizes with the occupation resistance. The resistance kept accelerating the number and impact of their operations, the Occupation Army started losing control of the situation.

<sup>13</sup> Nazerouya, M. D., "Plans for redrawing the Middle East: The Project For a "New Middle East". <http://globalresearch.ca/index.php?context=va&aid=3882> Nov. 18,2006.

In June 2004, the UN amended resolution 1546 to form an Iraqi government under occupation and promised to end the occupation during 2005 [14]. In reality intellectuals in Iraq know this is one way to dismiss the Occupying Forces from their responsibilities towards the occupied country according to international humanitarian law.

It is also an efficient way to get new Iraqi National Guard and security forces assembled with Kurdish Peshmerga, the pro-Iranian Shiia militia's, and involve them in taking responsibility for the sectarian blood bath that has been taking over the country, all in favor of implementing the new constitution that will ultimately disintegrate Iraq into three separate regions [15].

With the help of thousands of Foreign Security Contractors (e.g. Black water) [16] and local death squads tens of thousands of innocent people were killed [17]. Torture and illegal imprisonment of citizens, besieging and blockading of entire cities and centers were spreading maniacally throughout the country (with the exception of Kurdistan area). Serious violations of humanitarian law have been committed by the US administration and military authorities that can be considered as war crimes [18].

More than 1.1 million were killed or died since the beginning of the military operations in 2003 [19] [20]. This is not necessarily in armed conflicts, but in a massive killing plan achieved through the following:

1. Intentional killing and forced migration of medical doctors and health care personnel [21]. It is estimated that more than 40% of hospitals health care personnel fled or got killed during occupation and governmental forces attacks on hospitals. Without healthcare, more people died including children, women and the elderly.
2. Taking over hospitals and health care centers by assigning snipers to nearby rooftops in order to murder any patient in need of immediate medical care, as was the case in the battle of Falluja and Haditha and many other incidents [22].
3. Direct killing of patients inside hospitals in what appears to be occupational encouraged sectarian driven violence.

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<sup>14</sup> Amnesty International "CARNAGE AND DESPAIR: Iraq five years on". Al Indea No:MDE-14/001/2008 March 2008.

<sup>15</sup> Robert Fisk: Somebody is trying to provoke a civil war. ABC- Australia -Lateline. Reporter Tony Jones 3/2/2006

<sup>16</sup> Pierre Trisitam, "Black Water Mess: Unaccountable Mercenaries?" About. Com. Middle East Issues. [www.middleeast.about.com/od/iraq/a/meo/103.htm](http://www.middleeast.about.com/od/iraq/a/meo/103.htm)

<sup>17</sup> Fuller, M. "Crying Wolf: Medical Disinformation and Death Squads in Occupied Iraq" Global Research. Feb 13, 2006 <http://www.globalresearch.ca/index.php?context=viewArticle&code=FUL20051110&articleId=1230>

<sup>18</sup> Consumers for peace."War Crimes Committed by the United States in Iraq and Mechanisms for Accountability" with the advice of Karen Parker. Oct.10, 2007. [http://www.brusseltribunal.org/pdf/war\\_crimes\\_iraq\\_101006.pdf](http://www.brusseltribunal.org/pdf/war_crimes_iraq_101006.pdf)

<sup>19</sup> ORB. "US Invasion and Occupation killed one Million in Iraq". ICH. By AFP 31/1/2008

<sup>20</sup> David Godner "American Genocide in the Middle East: Three Million and Counting". Global Research, Aug. 13, 2000

<sup>21</sup> Dahr Jamail, "Iraqi Hospitals Ailing under Occupation" World Tribunal on Iraq, Istanbul, Turkey June 24, 2005. <http://www.brusseltribunal.org/pdf/HealthcareUnderOccupationDahrJamail.pdf>

<sup>22</sup> Stop the violations of the right to health, 2005. <http://www.brusseltribunal.org/healthworkers.htm>



4. Cutting all kinds of medicine and life supporting systems and aids when attacking cities and villages refuse the existence of occupation forces in their areas. The occupation and governmental forces attacked Fallujah's medical infrastructure as they did in, Diyala, Haditha, Al-Qaim, Tal A'afar, Ramadi, Al-Sadre, Basrah and Samara cities to name few.
5. Denying conflict area resident's potable water, acquiring food [23] and sanitation services to force them to live amongst their own waste for months at end. A method similar to using biological pathogens warfare in civilian areas to get rid of as much people in those areas as possible. In Baghdad alone areas like Khadra'a, Amyria and Aadhamia to name a few, have gone through this dilemma.
6. Attacking religious centers, and places of worship (Mosques and Chapels) and mass killing of the worshippers inside, not to mention violations of their basic human rights to practice their beliefs.
7. Intentional assassination of Academics, engineers, civil service personnel, journalists, and International Organizations staff [24].

Forcing professionals to flee the country caused the Iraqi government to depend on foreign companies like Halliburton and Bechtel to rebuild the country, companies who have been robbing the country blind for the past five years with no reconstruction.

About 4.5 million forcefully displaced Iraqis fled their country or homes and cities, 2.5 million of them are internally displaced inside Iraq [25]. Another 1.5 million In Syria and 0.5 in Jordan

Table 2 shows approximately the numbers of Iraqi forced immigration in different countries.

**Table 2** Numbers of forcefully displaced Iraqi [25] [26]

Location	No. of Refugees	Location	No. of Refugees
Inside Iraq	2000 000	United Kingdom	22 000
Syria	1400 000	Netherland	21 000
Jordan	500 000	Sweden	21 000
Gulf Countries	200 000	Australia	11 100
Egypt	100 000	Denmark	10 700
Lebanon	50 000	Norway	8 500
Iran	40 000	United States	6 000
Turkey	10 000	Switzerland	5 000
Germany	52 000	Canada	4 000

<sup>23</sup> BBC Arabic "Humanitarian Condition in Iraq is the most dangerous in the World". March 16, 2008.

<sup>24</sup> List of Killed, threatened, and kidnapped Iraqi Academics. <http://www.brusseltribunal.org/academicsList.htm>.

<sup>25</sup> UN refugee Studies Center "Iraqi displacement crisis: The search for solution", In Forced Migration review special report, June 2007.

<sup>26</sup> Statistics on Displaced Iraqis around the world. Global Overview Sept. 2007. Published on <http://www.brusseltribunal.org/Refugees.htm>

8. Excessive use of power and illegal weapons by the occupation and government forces on civilians in attacked cities. Collective punishments of women, children, and elders have added more victims in areas of conflicts [27]. Mass Killing of civilians in Falluja, Haditha, Mahmoudia, Ishaky Diyala, Ba'aquba, Al-Qaiem, Arab Juboor and other areas are all considered as grave breaches of International Humanitarian Law and war crimes.[18 ]
9. Starvation and war induced poverty includes more than 50% of the Iraqi population[28] whom live in an oil rich country with approximately 70% of the youth unemployed who have to survive in a crushed economy plagued with inflation.
10. Mass killing have resulted in the great suffering of about three million widows and Four and a half million orphans [28] without financial support, most of which dropped out of school abandoned their education in order to feed their families [29].

Hardship that resulted from the lack of non-electrical power service. In Baghdad, most areas get 2 hrs/day of electricity [30] [31]. Serious consequences resulted from this problem such as the inability to operate medical services, pumping stations of potable water and sewage collection and delivery to treatment stations. Also the inefficiency of fully operating sewage treatment plants caused huge pathogenic pollution in two major Iraqi rivers, Tigris and Euphrates. Figure 2 shows the failure in drinking water bacteriological tests in each governorate as of 2004 [32]. With lack of medical services thousands of children and other Iraqi citizens died from the failure of Sanitation even in the capitol of Iraq, Baghdad [33].



<sup>27</sup> Meda, A., Saruta, S., and Inamori, K." The Excessive Use of Weapons and Banned Weapons." ICTI. World Tribunal on Iraq, Istanbul, Turkey, 2005.

<sup>28</sup> Voices of Iraq (VOI): 4.5 million orphans in Iraq a tragic situation...new official report, Jan 2008.

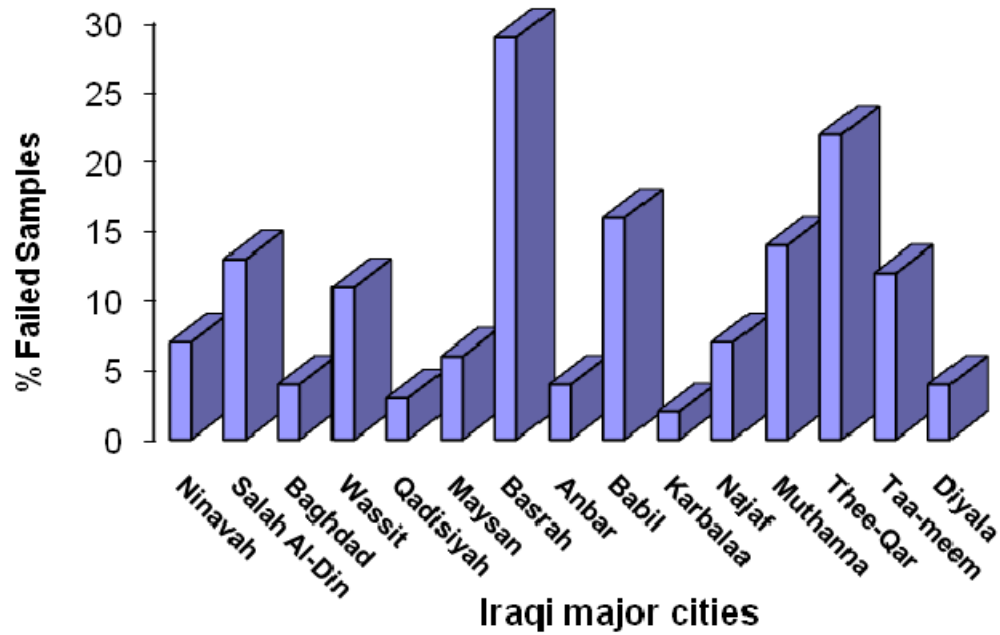
<sup>29</sup> Al-Azzawi, Souad "Deterioration of Iraqi Women's Rights and Living Conditions Under Occupation". <http://www.brusselstribunal.org/pdf/WomenUnderOccupation.pdf> and <http://www.globalresearch.ca/index.php?context=va&aid=7785> Jan, 2008.

<sup>30</sup> Oxfam Briefly Paper 105: Rising to the humanitarian challenge in Iraq. July, 2007

<sup>31</sup> Human Rights Watch, "Off Target: The conduct of the war and civilian casualties in Iraq." Dec. 2003.

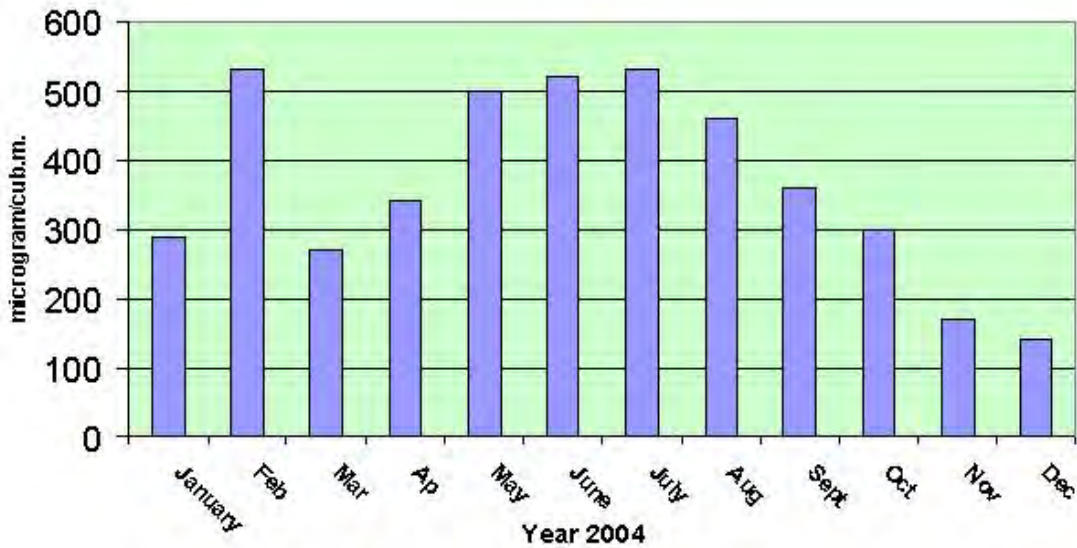
<sup>32</sup> Al-Omer, M. "State of Environment in Iraq" Ministry of Environment Annual Report. Volume I, Urban Environment. Baghdad, Iraq, 2005

<sup>33</sup> Glanz, J. "Hepatitis outbreak laid to water and sewage failure" New York Times, Sept. 25, 2004.

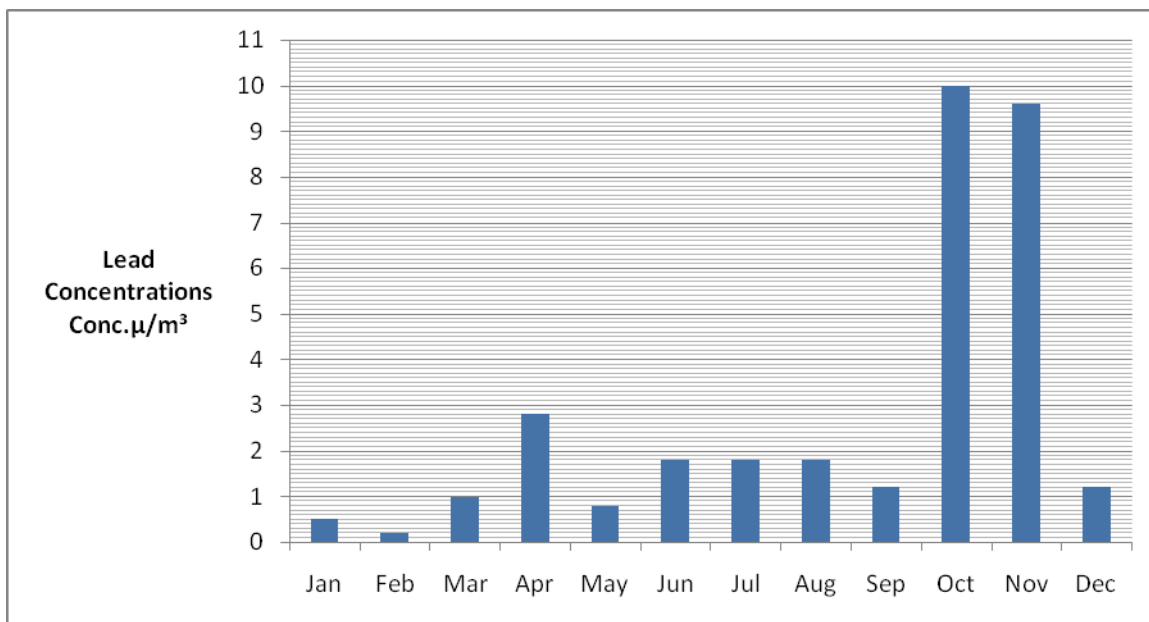


**Figure 2** Failure in bacteriological Tests in Iraqi Governorates in the year 2004 [32]

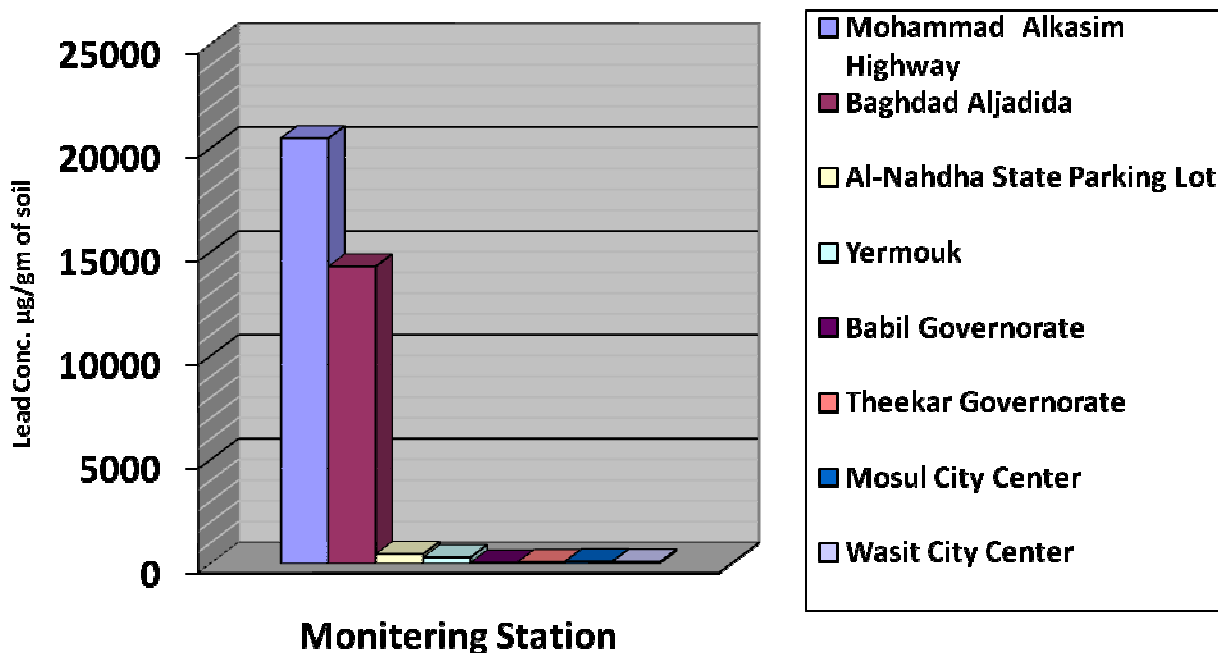
Total failure in controlling environmental quality parameters all over Iraq. Concentrations of air and water pollutants are permanently higher than International Standard. Figures 3, 4 and 5 Show some of these environmental quality measurements [32].



**Figure 3** Mean monthly suspended particles concentration in the air in Baghdad city in the year of 2004 [32]



**Figure 4** Monthly average Air Lead Concentrations in Baghdad/Andalus Monitoring center, 2004 [32]



**Figure 5** Monthly average Lead concentration in settled dust from air at different places in Iraq in 2004 [32]

Bulldozing hundreds of acres of green date palms, orange and lemon trees in central and eastern areas of Baghdad as a collective punishment for farmers whom refuse to supply the occupation forces with information about the resistance fighters [34]. Deforesting these areas cause total damage to all related ecological settings and species in these areas, and increased desertification in an already semi arid country like Iraq

As we can see, major breeches to the Geneva Conventions I, III, and IV of 1949 have been committed by the occupational authorities and forces. War crimes such as willful killing, torture or inhumane treatment, unlawful detention, deportation or transfer of civilians, unlawful transfer of POW's; denying civilians or POW's of fair trial rights; hostage taking, and wanton destruction and appropriation of property [18] were all committed by the occupation and its assigned government. If we add other more than million death casualties as a result of USA imposed comprehensive sanctions on Iraq from 1991-2003, it is very clear that a planned Genocide have been committed against the Iraqi people [35].



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<sup>34</sup> "US Troops Bulldoze Crops"

<http://news.independent.co.uk/low-res/story.jsp?story=452375&host=3&dir=75>

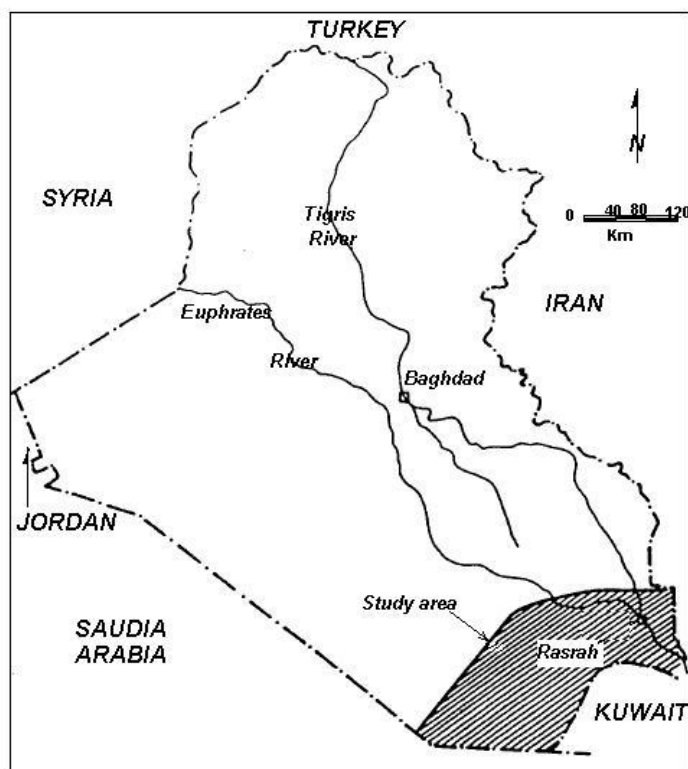
<sup>35</sup> Ian Douglas "US Genocide in Iraq" <http://www.brusseltribunal.org/pdf/NotesOnGenocideInIraq.pdf> 2007

### 3.0 Contamination of Iraq with Depleted Uranium

Depleted Uranium (DU) weapons are manufactured from radioactive waste generated during the enrichment process of natural uranium as part of the nuclear fuel cycle.

American and British armed forces fired DU bullets and projectiles for the first time against the human population and environment in Iraq during Gulf War I, 1991<sup>[36]</sup>. About 320 tons of DU expenditure was used to destroy the withdrawing Iraqi troops from Kuwait.

Large areas in both Kuwait <sup>[37]</sup> and Southern Iraq are contaminated by the shell casing, fragments, shrapnel, and microscopic DU oxides. Figure 6 shows contaminated areas in southern Iraq as in 1991<sup>[38]</sup>.



**Figure 6** Contaminated areas in southern Iraq after Gulf War I 1991

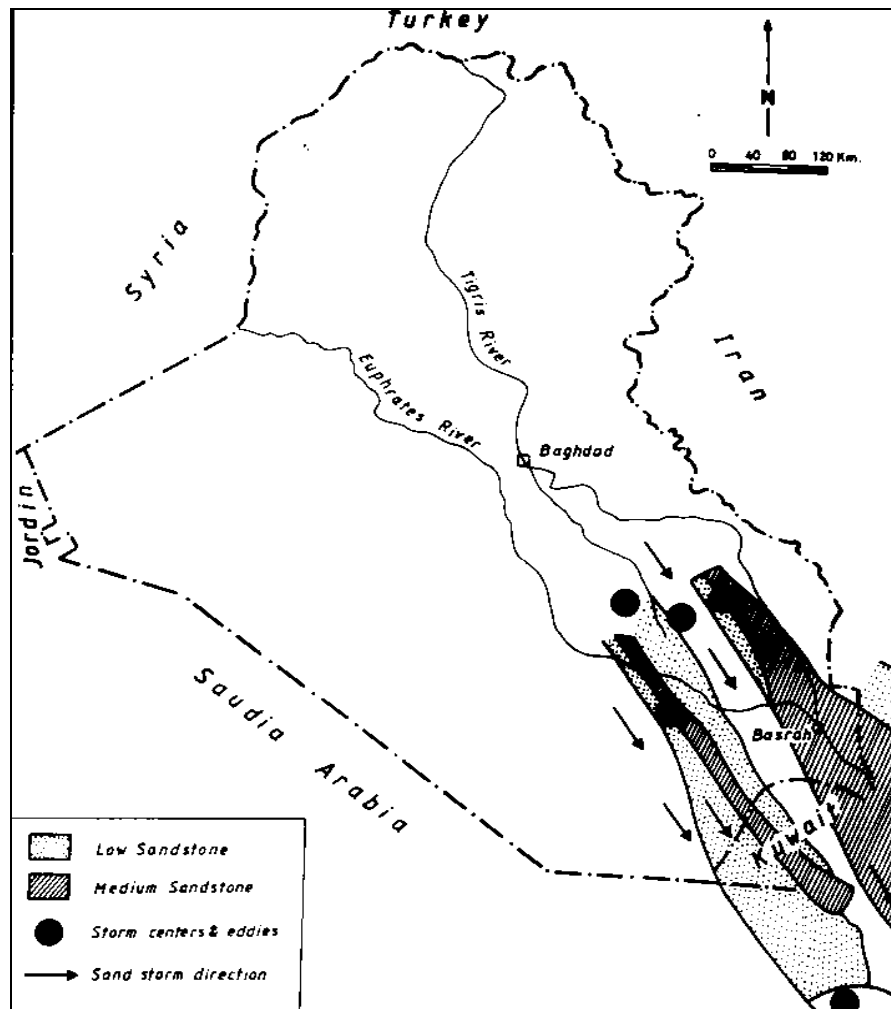
The Pentagon refused to release any information about the nature, amount, and locations of these weapons inside Iraq. Exposure of American troops to these weapons during combat, maneuvering, handling, storing, wind blown towards Kuwait, DU oxides and re-suspended

<sup>36</sup> "Metal of Dishonor." Depleted Uranium Education Project, NY, USA 1997.

<sup>37</sup> Bou -Rabee, F. "Estimating the Concentration of Uranium in Some Environmental Samples in Kuwait after the 1991 Gulf War." *Appl. Radiat* Vol. 46, No 4, pp 217-220, 1995. Elsevier Science Ltd. UK.

<sup>38</sup> Al-Azzawi, S. et al, " Environmental Pollution Resulting from the Use of Depleted Uranium Weaponry Against Iraq During 1991, World International Conference on DU, Hamburg, Germany, 2003  
[http://www.grassrootspeace.org/wuwc\\_reader2\\_science.pdf](http://www.grassrootspeace.org/wuwc_reader2_science.pdf) - p.41

contaminated dust storms, all caused what we call the Gulf War syndrome. Dominant wind direction in Iraq is NW-SE [40]. Figure 6 shows sand storms directions towards Kuwait [39].



**Figure 7** Sandstorms directions in studied area towards Kuwait [39]

Not knowing much about the nature of those weapons, the destroyed artilleries between the Iraqi-Kuwaiti border and Southern and Western Basra city up to Nasrya were kept in place for about four years. The DU contaminated tanks and artilleries are continuous sources of radioactive contamination. The American Administration is totally responsible for the increased exposure of the human population and other ecological species to DU oxides and particles through daily direct contact with the destroyed tanks, the continuous exposure to contaminated dust storms towards heavily populated Basra city, the contaminated food chain where these artilleries acted as good water conduits for the natural grasses and vegetation cover for the sheep to graze on, and other related environmental pathways[40]

<sup>39</sup> (KSC), Kuwait Oil Company, "Physical damages to the Desert Surface", contract No. 93B2U2, ERU/6.5/03B, 1993.

<sup>40</sup> Maguar, A.J. "Effects of DU Weapons on Human and Natural Environment in Selected Areas in Southern Iraq", M.Sc. Thesis in Environmental Engineering, College of Engineering, University of Baghdad, 1999.

Radioactivity measurements related to DU contamination started in Iraq after two years of contaminating the area. Detection of Kharange, Shamia Airfield, Jabal Sanam, and Gudairat Al-Audhaimi areas, west and south of Basra City, were done in 1993 by a team from Iraqi Atomic Energy Commission and Science College of Baghdad University [<sup>41</sup>].

In 1996, a more comprehensive exploration program was conducted by the Environmental Engineering Department of Baghdad University. Air, surface and ground water, soil, dust, animal tissues and vegetation cover were all sampled. Sampling and testing procedures were all conducted according to the IAEA [<sup>38</sup>] [<sup>42</sup>]. Laboratory tests using Gamma Spectrometry, High Purity Germanium Detector proved the existing of DU related contamination through defining the ratio of U235/U238 in the collected samples in areas of Al-Zubair, Jabal Sanam, Safwan, Southern Rumaila Oil Fields, and Northern Rumaila oil Fields.[<sup>43</sup>] [<sup>40</sup>] [<sup>44</sup>] [<sup>38</sup>].

Table 3 shows some of these results. Instead of helping the people in Iraq to cope with the problem like they did in Kuwait, the USA administration kept denying these results claiming that the researchers were working with the (Government) and that the results were called (Iraqi Government Propaganda). The US Administration knew very well from their members in UN Weapon search teams (MOVIC) that all the DU related testing programs in Iraqi Atomic Commission Laboratories were checked continuously by that team.



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<sup>41</sup> International conference on DU, 2000, "Health, ecological, legal, and economic aspects of conventional radioactive weapons", committee of solidarity with the Arab Cause, Nov.,2000.

<sup>42</sup> IAEA, "Measurement of Radionuclide in food and Environment." Vienna, Tech. Rep. No 1, 1981.

<sup>43</sup> Al-Heli, W.M. "Effects of DU Weapons on Air and Soil Pollution in Southern Iraq", M.Sc. Thesis in Environmental Engineering, College of Engineering, University of Baghdad, Iraq. 1998.

<sup>44</sup> IAEA, "Measurement of Radionuclide in food and Environment." Vienna, Tech. Rep. No 1, 1981.

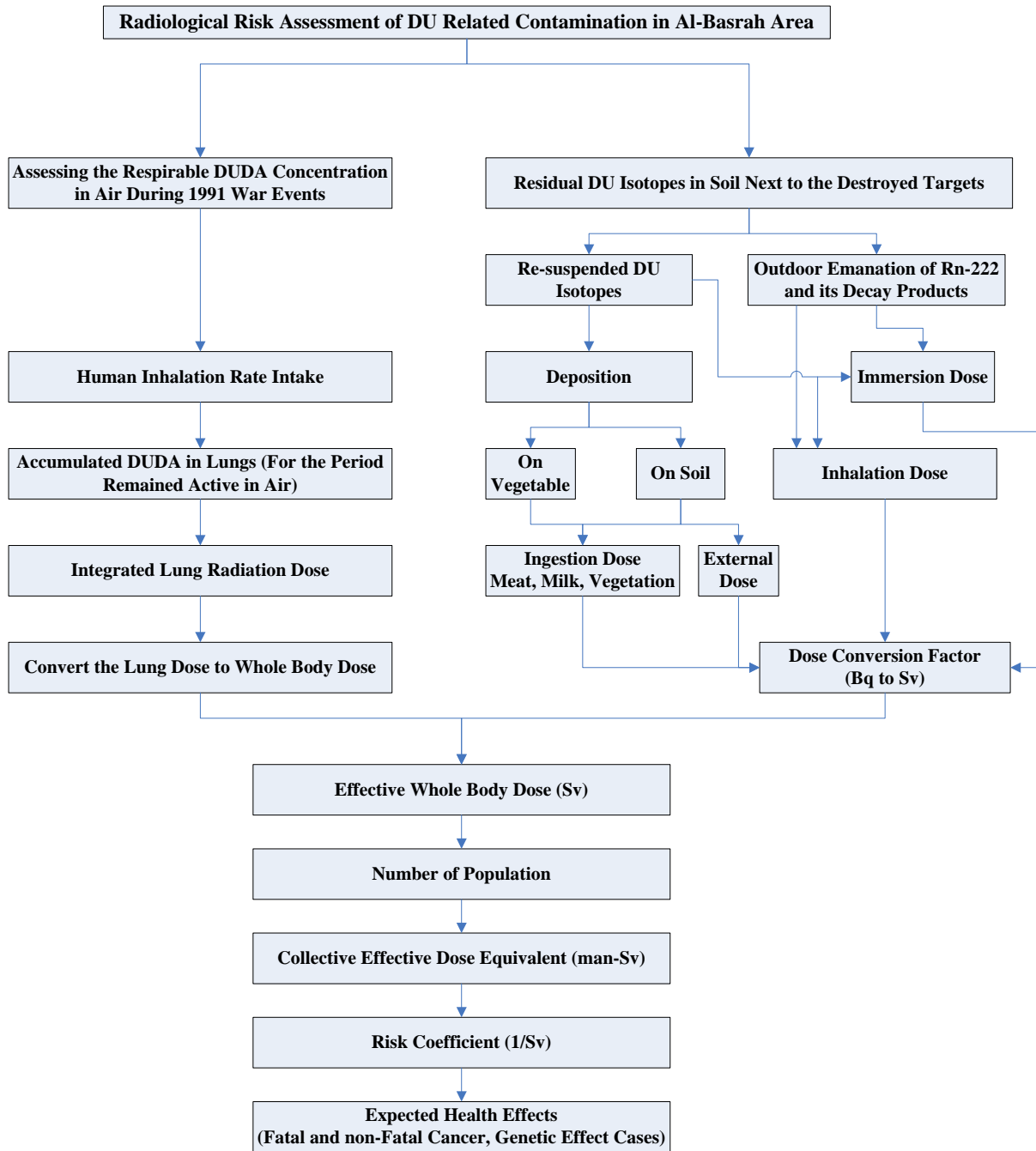


**Table 3** Selected Exposure and Soil Radioactivity Measurements in Studied Area

Sample Symbol	Location	Type of Sampled Target	Exposure $\mu\text{R/hr}$	Activity Concentration in Soil (Bq/Kg)		
				Th <sub>234</sub>	U <sub>235</sub>	U <sub>235</sub> / U <sub>238</sub>
S-2-2	Northern Jabal Sanam	A <sub>1</sub>	28.6	3918	41.9	0.01069
S-2-9	Northern Jabal Sanam	T <sub>13</sub>	30.5	4401	57.1	0.0129
SN-1-2	Jabal Sanam	T <sub>1</sub>	36.8	11400	183	0.0167
SN-2-3	Jabal Sanam	T <sub>2</sub>	17.1	2550	47.3	0.0185
S-4-1	NW Jabal Sanam	T <sub>4</sub>	15.3	3408	30.9	0.009
S-5-3	North Safwan City	T <sub>5</sub>	16.3	7310	79	0.010
S-6-2	North Safwan City	T <sub>6</sub>	14.4	2019	36.3	0.017
R-1-6	Northern Rumaila Oil Field	T <sub>7</sub>	75.5	27800	375	0.013
R-3-2	Northern Rumaila Oil Field	T <sub>8</sub>	58	79100	119	0.014
R-4-3	Northern Rumeila Oil Field	A <sub>4</sub>	43	9700	70.3	0.007
RK-1-1	Southern Rumaila Oil Field	T <sub>9</sub>	80.8	55700	901	0.0161
RK-2-2	Southern Rumaila Oil Field	T <sub>10</sub>	51.9	40900	531	0.013
RK-3-2	Southern Rumaila Oil Field	T <sub>11</sub>	42.1	21700	198	0.009
RK-4-1	Southern Rumaila Oil Field	T <sub>12</sub>	43	31600	229	0.007
S-7-3	Jabal Sanam	A <sub>2</sub>	48	3120	25.1	0.008

The studies included modeling DU contamination through environmental pathways to the Human body among the population in the contaminated areas and Iraqi and the American troops. Results of the modeling and risk assessment suggests that the studied group have received an annual whole body dose of (442-577) mSv from inhaling DU oxides compared to 2.4 mSv total annual dose the human body receives from all radioactive sources in the

environment [45]. Figure 8 shows environmental pathways considered in assessing the risk in these studies [45].



**Figure 8** Environmental Pathways considered in assessing the risk in these studies

<sup>45</sup> Al-Azzawi, S., and Al Naemi, A., 2002, "Assessment of radiological doses and risks resulted from DU contamination in the highway war zone in Al-Basra governorate", proceedings of the conference on the effects of the use of DU weaponry on human and environment in Iraq, March 26-27 2002, Baghdad, Iraq.

The use of DU supported weapons were continued in other parts and locations of Iraq. Weapons as Tomahawk, Bunker Buster and others with DU balancing weights [<sup>46</sup>] were all used in 1998, and other attacks on Iraq within the illegal no fly zones, northern and southern Iraq.

During the invasion of Iraq military operations of 2003, American and British armed forces used DU munitions in heavily populated areas this time, like in Baghdad.

Japanese researchers Komara, Fujita and Furukawa, 2003 measured the isotopic ratio of U235/U238 of the collected samples from areas where DU munitions have been used. They used gamma spectrometry high purity germanium analyzer (similar to what was used by Iraqi researchers before them). The results showed the existing of DU related contamination in the samples that were claimed from areas of military operations of 2003 [<sup>47</sup>].

A Major reason of denying the health damages of (DU) weapons is the profits the weapons industry is gaining from turning a harmful hazardous nuclear waste into a multi billion dollar business.

By 2007, eighteen countries are thought to have DU weapons in their arsenals. These include UK, USA, France, Russia, Greece, Turkey, Israel, Kingdom Saudi Arabia, Bahrain, Egypt, Kuwait, Jordan, Pakistan, Oman, Thailand, China, India and Taiwan [<sup>48</sup>].

The three US companies that produce large caliber DU rounds are: Alliant Techsystems, Day and Zimmerman/American Ordnance, and the former Primex Technologies.

The global DU waste stockpiles all around the world have been estimated to be 1.3 million tons in 2001 with an annual increase of 50,000 tones [<sup>48</sup>]. Environmental organizations, groups, and activists have been working last two decades to ban Uranium weapons and armors. On the 22<sup>nd</sup> of March, 2007 Belgium was the first ever nation in the world to ban DU weapons [<sup>49</sup>]. During November 2007 the UN First Committee passed Depleted Uranium Resolution which requests that states and international bodies submit a report on DU to a UN General Assembly during next years session [<sup>50</sup>].

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<sup>46</sup> William, Dai "Hazards of Uranium Weapons in the Proposed War on Iraq" full report.. The Eos life resources center. Oct, 2002.

<sup>47</sup> KOMURA, K., FUJITA, X, and FURUKAWA, M. "Isotopic Ratio of Depleted Uranium Used in Iraq war". Japan Radiation Research, vol. 46, no. 429, page 193, 2003.

<sup>48</sup> Dug Weir, "The facts on depleted Uranium", New internationalist, Nov, 2007.

<sup>49</sup> William Van Den Panhuysen. "Belgium Bans Uranium Weapons and Armor". ISBUW, March 24, 2007.

<sup>50</sup> ICBUW, "UN First Committee Passes DU Resolution in Landslide Vote" Nov. , 2007

<http://www.bandepleteduranium.org/>

## 4.0 Synergic Health Effects as a result of using DU weapons on starving, depressed population of Iraq

Depleted Uranium is considered as both radioactive and toxic. Previous studies of the DU health effects have concluded that neither of these characteristics poses a significant risk to human health.

The increasing number of cancer incidences among the Iraqi populations of southern Iraq after the use of DU [<sup>51</sup>], as well as miscarriages, congenial malformations [<sup>51</sup>], children's Leukemia [<sup>52</sup>], and the Gulf War Syndrome amongst the American veterans who served in Gulf War I, 1991 all made the specialists suspect these conclusions. A serious debate has been going on for more than fifteen years about which of the following characteristics of DU is more harmful: radiological, toxic or the combination of both.

When DU munitions hit the target, they ignite prophetically and generate heat that reaches a temperature of 3000-6000]. This heat causes a sublimation of DU and other metals to form a gas or aerosol that is considered as (nano-particles)[<sup>53</sup>].

The nano-particles can cross the lung-blood barrier and gain entrance to the cells and create free radicals. This is an effect of ionizing radiation. The other effect of DU comes from the fact that it is classified as a toxic heavy metal. Heavy metal toxicity attacks the proteins in the cell which normally fights the free radicals and creates additional free radicals [<sup>53</sup>]. This causes an oxidative stress that leads to failure of protective enzymes, damaging the cellular communication system and the mitochondria. Free radicals can also disrupt the proteins folding process of (DNA), this misrouting of proteins causes certain diseases such as cystic fibrosis, diabetes insipidus and cancer.

Amassing and accumulation of misfolded proteins leads to neurodegenerative diseases like Parkinson's disease. Gulf veterans have manifested many of the symptoms of these neurodegenerative diseases. Other effects are [<sup>53</sup>]:

- Immune and Hormonal systems' damage
- Distribution of thyroid function
- Mycoplasmal Invasion to human body
- Tetrogenic Toxicity, where soluble DU oxides crosses the placenta to the fetus. As a result damages might range from behavioral problems to mental retardation and congenital malformations.

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<sup>51</sup> Kimberly Bernard, Martia Butcher, Roy Farrell MD, Robert McGould MD, Michael McCally MD."DU: Health and Public Health Issues Arising from the use of Depleted Uranium Munitions". Physicians for social Responsibility, Oct 2005.

<sup>52</sup> Korhler, R.C. "Spreading Cancer, Depleted Uranium turns Bush's lies into high-tech horror". <http://www.uruknet.info/>, June 27, 2006

<sup>53</sup> Rosali Bertell "Depleted Uranium: All the questions about DU and Gulf War Syndrome are not yet answered". International Journal of Health Service 36(3), 503-520, 2006

Studies proved that the Gulf War I male veterans were twice as likely- and female veterans almost three times as likely- to report children with birth defects than counterparts who did not serve in the first Gulf War [53].

In her analysis, Dr. Bertell emphasized that carcinogenic properties of Uranium are linked to the lowered immunity in the individual where a depressed immune system often changes the status of subclinical cancer into a clinically diagnosable cancer [53]. Other related important studies related to these aspects are of A. Miller, et al [54] [55], and H. Schroder [56].

As we can see, these scientific findings and evidences explain what some of the Iraqi researchers published back in 1998 about the final stages of the damaging health effects of DU on the human population in DU contaminated areas of Basra and its suburbs. At that time, most of the Iraqi researchers couldn't explain the mechanism and the ways these contaminants acted within the human body.

Such studies of Alim Yacoub, Emad Al-Sadoon, Jenan Hassan, and Huda Ammash showed the following [57] [58] [59] [60]:

- Five to six fold increase in Cancer incidences with change in Pattern and geographical distribution towards contaminated areas in Basra City.
- Appearance of more of one type of cancer in the same family or person.
- Higher rates of congenital abnormalities among Basra population.
- Increase of infertility cases, renal and hepatic dysfunction, cardiovascular diseases.
- Among the studied Gulf War 1 Iraqi veterans, 1425 cancer cases registered from 1991 to 1997. These cases included Lymphoma, Leukemia, and Lung Cancer respectively.

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<sup>54</sup> A. Miller, et al. "Genomic instability in human osteoblast cells after exposure to depleted Uranium: Delay lethality and micronuclei formation". Journal of Environmental Radioactivity. vol.64(2-3), 2003 (PP 247-259).

<sup>55</sup> A. Miller, et al, "Effect of the military-relevant heavy metal, depleted uranium and heavy metal tungsten-alloy on gene expression in human liver carcinoma cells (HepG2)." Mol. Cell Biochem. vol. 255(1-2). Jan. 2004 (PP. 247-56)

<sup>56</sup> Schroder, H. et al. "Chromosome aberration analysis in peripheral lymphocytes of Gulf War and Balkans War veterans". Radiation Prot. Dosimetry. Vol. 103(3) 2003 (PP. 211-219).

<sup>57</sup> Yaqoub, A., Ajeel, N., and Al-Wiswasy, M., 1998, "Incidence and pattern of malignant diseases (excluding leukemia) during 1990-1997", Proceeding of the conference on health and environmental consequences of DU used by U.S. and British forces in the 1991 Gulf War, Dec. 2-3, 1998, Baghdad, Iraq.

[http://www.irak.be/ned/archief/Depleted%20Uranium\\_bestanden/DEPLETED%20URANIUM-3-%20INCIDENCE.htm](http://www.irak.be/ned/archief/Depleted%20Uranium_bestanden/DEPLETED%20URANIUM-3-%20INCIDENCE.htm)

<sup>58</sup> Al-Sadoon, I., Hassan, J., and Yaqoub, A., 1998, "Incidence and pattern of congenital anomalies among birth in Basrah during the period 1990-1998", Proceeding of the conference on health and environmental consequences of DU used by U.S. and British forces in the 1991 Gulf War, Dec. 2-3, 1998.

[http://www.irak.be/ned/archief/Depleted%20Uranium\\_bestanden/DEPLETED%20URANIUM-1-%20INCIDENCE.htm](http://www.irak.be/ned/archief/Depleted%20Uranium_bestanden/DEPLETED%20URANIUM-1-%20INCIDENCE.htm)

<sup>59</sup> Yaqoub, A., et.al., 1999, "Depleted Uranium and health of people in Basrah: an epidemiological evidence; 1-The incidence and pattern of malignant diseases among children in Basrah with specific reference to leukemia during the period of 1990-1998", the medical journal of Basrah University (MJBU), vol.17, no.1&2, 1999, Basrah, Iraq.

<sup>60</sup> Ammash, H., Alwan, L., and Maarouf, B., "Genetic hematological study for a selected population from DU contaminated areas in Basra." Proceeding of the conference on the effects of the use of DU weapons on human and environment in Iraq, Baghdad, Iraq 2002.

Other registered types are; bone, liver, brain, gastrointestinal, and pancreatic cancer case

One important factor that might explain these health damages is the joined impact of the sanction and the DU contamination. Starvation of the Iraqi population during the Nineties with the intensive exposure to DU contaminants caused serious damages to their immune system. Damages of the body immune system disabled their body to fight the initiation of cancer and other previously mentioned DU related health damages. The synergic effects of both the sanction and DU contamination have resulted in the previously mentioned multifold health damages in contaminated areas.

Thousands of cases should be studied in relation to DU contamination in Iraq to find the proper ways and treatments to reduce the losses. The American Administration suppressed all suggested studies related to this issue in Iraq. This is a criminal act against the people and environment of Iraq.

The Minister of Environment under the occupation government finally admitted in 2007 the existence of more than 350 highly contaminated related to DU sites. She also admitted the existing of high rate of cancer in Iraq due to the use of Depleted Uranium weapons [<sup>61</sup>].

The occupation bears total responsibility for the increasing health damages as a result of using DU weapons in Iraq and not taking any serious action to confine the problem. After seventeen years, and the death of thousands of Iraqi men, women, and children due to the use of DU, the International organizations are not permitted to conduct any exploration programs to assess the risks posed on human population and environment in Iraq [<sup>62</sup>], the way it was done in Kosovo in 1997 and 2000 [<sup>63</sup>].

The problem is still ongoing, where millions of Iraqis breathe, ingest, and are being exposed continuously to DU oxides and particles absorbed to soil and sand in the contaminated areas, not discriminating between civilians and the troops and the targets they were shot at during military operations.

To Iraqis, the DU attacks continue, adding more and more victims each day. DU weapons are illegal according to the Hague Convention of 1907 of poisons, the 1925 Protocol on Gases, Protocol I of the 1983 convention on "Conventional" weapons that prohibit non-detectable fragments and indiscriminate [<sup>63</sup>].

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<sup>61</sup> Sunday Herald, "WHO suppressed scientific study into depleted uranium cancer fears in Iraq". Feb 22, 2004

<sup>62</sup> RIA Novoski "Iraqis blame US depleted Uranium for surge in cancer"

<sup>63</sup> WEP, "Depleted Uranium in Kosovo Post Conflict Environmental Assessment". Geneva, 2001.

#### 4.1 Violations of Occupation to International Humanitarian Law:

The US/British occupation of Iraq has gravely breached humanitarian law in the following aspects [18]:

1. Dismissing Iraqi national military and security force. Article 2 of each of four Geneva Conventions of 1949, and articles (42-56) of the Hague Regulations address obligations imposed on occupying power towards occupied people. One major duty that was totally affected by dissolving the Iraqi Armed Forces was the failure of ensuring life, health and safety of the civilian population of Iraq.
2. Failure of ensuring basic human needs such as food, water and healthcare where article 54 of Protocol Additional I provides a clear statement regarding these issues.
3. Using military tactics and attacking using prohibited weapons e.g. DU, cluster bombs, Napalm, White Phosphorus...etc. And excessive use of firepower against civilians.
4. Breakdown of Iraq's medical infrastructure and continuous attacks on hospitals (Geneva Conventions IV, Articles 18-23, 55 and 56) consider carrying out military operations against medical facilities, personnel or vehicles as serious violations of humanitarian law.
5. Failing to protect the lives of Iraqi civilians. More than one million [19] of Iraq's population has died for different reasons since the invasion. Article 16 of the Geneva Convention IV, the occupation authority and military forces are obligated to account for civilian deaths.
6. Worsening of economic conditions, unemployment and deterioration of women's rights and living conditions.
7. Violation of children's rights of a secure life. Kidnapping, children school drop-out, under-age and children employment all the responsibility of the occupation.
8. Large scale illegal detention of civilians and the use of torture and abuse of basic human rights of detainees.

State politicians and leaders, military leaders, senior officers and field officers are all considered accountable for crimes committed against the people and environment of Iraq.

According to the Geneva Convention, the violators should be brought to justice. The international community is urged to save the Iraqi people, ending the US lead occupation of Iraq through official recognition and support of all forms of resistance, including armed resistance.

## 5.0 Conclusions:

Continuous use of Depleted Uranium weapons since 1991 against the population and the environment of Iraq is an act of crime. The occupation's total denial of the problem and refusing to allow international agencies to conduct any exploration programs to define the risk associated with this contamination, has resulted in more exposure to these radioactive pollutants, and more health damages.

Ignoring DU related health damages and the ongoing occupation of Iraq have proved to the world how desperate the American Administration is to control oil resources of the Middle East. Occupation of Iraq is a catastrophic criminal act that resulted in the death of over two million people and forced about five million of the population to leave their living areas inside and outside Iraq.

The occupying forces intentionally created a state of chaos during the invasion in 2003 to facilitate committing genocide against the Arab majority who refused the occupation of Iraq, ultimately changing Iraq's demography and national identity in favor of the occupation's new constitution and the minorities who helped them during the invasion and occupation of Iraq.

The occupation forces and allies failed to comply with Article 2 of the four Geneva Conventions of 1949, and articles (42-56) of the Hague Regulations that addresses obligations imposed on occupying powers towards occupied people. The occupation forces and its assigned governments failed to ensure basic human needs like potable water, food, medical care, education, sanitation, and security. The excessive use of power, besieging whole cities, illegal imprisonment of civilians and even children, and occupation induced poverty have all turned Iraq into a death camp.

The international community is urged to help Iraqis gain back their independence and sovereignty through getting the occupation forces out of Iraq and through refusing any shape of colonial, long term security treaties that would facilitate taking over the country and control the oil of Iraq through permanent foreign army bases.

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## Cited Works

1. War on Iraq: weapons. [www.cnn.com/specials/2003/iraq/weapons/index.htm](http://www.cnn.com/specials/2003/iraq/weapons/index.htm)
2. Simon Helweg-Larsen, "Irregular Weapons Used against Iraq". ZNET <http://www.znet.org/welser.htm>, April 2003 .
3. Sarah Meyer. "What Kind of Incendiary Bomb Was Used Against People in Iraq" <http://www.globalresearch.ca/index.php?context=va&aid=1226> November 14, 2005.
4. Steven D. "US Army Admits Use of White Phosphorus as Weapon". Daily KOS.
5. Scott Peterson Remains of Toxic Bullets Litter Iraq, May 18, 2003, Christian Science Monitor.
6. Baghdad Fires Pose Health Risks, War in Iraq, UNEP, March 13, 2003.
7. Draxler R. R., et al, "Estimating PM<sub>10</sub> Air concentrations from Dust storms in Iraq, Kuwait and Kingdom Saudi Arabia. Atmospheric Environment" vol35:4115-4330.
8. Ammash, H,"Toxic Pollution, the Gulf War, and Sanctions". Iraq Under Siege. Edited by Anthony Arnove. South End Press. Cambridge Massachusetts, 2001.
9. Nadeshda, 2004. The use of depleted Uranium. <http://www.nadeshda.org>
10. Deadly waste returned to US Forces, Green Peace, June 24,2003
11. Al-Azzawi, S. N. et al, "Environmental Damages of Military Operations During the Invasion of Iraq 2003" World International Tribunal, Istanbul, Turkey. June 2005.
12. Encarta Online Encyclopedia 2008. <http://encarta.msn.com>.
13. Nazerouya, M. D.," Plans for redrawing the Middle East: The Project For a "New Middle East". <http://globalresearch.ca/index.php?context=va&aid=3882> Nov. 18,2006.
14. Amnesty International "CARNAG AND DESPAIR: Iraq five years on". Al Indea No:MDE 14/001/2008. March 2008
15. Robart Fisk: Somebody is trying to provoke a civil war. ABC- Australia -Lateline. Reporter Tony Jones 3/2/2006
16. Pierre Trisitam, "Black Water Mess: Unaccountable Mercenaries?" About. Com. Middle East Issues. [www.middleeast.about.com/od/iraq/a/meo/103.htm](http://www.middleeast.about.com/od/iraq/a/meo/103.htm)
17. Fuller, Max: "Crying Wolf: Medical Disinformation and Death Squads in Occupied Iraq" Global Research. Feb 13, 2006 <http://www.globalresearch.ca/index.php?context=viewArticle&code=FUL20051110&articleId=1230>

18. Consumers for peace. "War Crimes Committed by the United States in Iraq and Mechanisms for Accountability" with the advice of Karen Parker. Oct.10, 2007.  
[http://www.brusseltribunal.org/pdf/war\\_crimes\\_iraq\\_101006.pdf](http://www.brusseltribunal.org/pdf/war_crimes_iraq_101006.pdf)
19. ORB. "US Invasion and Occupation killed one Million in Iraq". ICH. By AFP 31/1/2008
20. David Godner "American Genocide in the Middle East: Three Million and Counting". Global Research, Aug. 13, 2000
21. Dahr Jamail, "Iraqi Hospitals Ailing under Occupation" World Tribunal on Iraq, Istanbul, Turkey June 24, 2005. <http://www.brusseltribunal.org/pdf/HealthcareUnderOccupationDahrJamail.pdf>
22. Stop the violations of the right to health, 2005. <http://www.brusseltribunal.org/healthworkers.htm>
23. BBC Arabic "Humanitarian Condition in Iraq is the most dangerous in the World". March 16, 2008.
24. List of Killed, threatened, and kidnapped Iraqi Academics.  
<http://www.brusseltribunal.org/academicsList.htm>.
25. UN refugee Studies Center "Iraqi displacement crisis: The search for solution", In Forced Migration review special report, June 2007.
26. Statistics on Displaced Iraqis around the world. Global Overview Sept. 2007. Published on <http://www.brusseltribunal.org/Refugees.htm>
27. Meda, A., Saruta, S., and Inamori, K." The Excessive Use of Weapons and Banned Weapons." ICTI. World Tribunal on Iraq, Istanbul, Turkey, 2005.
28. Voices of Iraq (VOI): 4.5 million orphans in Iraq a tragic situation...new official report, Jan 2008.
29. Al-Azzawi, Souad "Deterioration of Iraqi Women's Rights and Living Conditions Under Occupation". <http://www.brusseltribunal.org/pdf/WomenUnderOccupation.pdf> and <http://www.globalresearch.ca/index.php?context=va&aid=7785> Jan, 2008.
30. Oxfam Briefly Paper 105: Rising to the humanitarian challenge in Iraq. July, 2007
31. Human Rights Watch, "Off Target: The conduct of the war and civilian casualties in Iraq." Dec. 2003.
32. Al-Omer, M. "State of Environment in Iraq" Ministry of Environment Annual Report. Volume I, Urban Environment. Baghdad, Iraq, 2005
33. Glanz, J. "Hepatitis outbreak laid to water and sewage failure" New York Times, Sept. 25, 2004.
34. "US Troops Bulldoze Crops"  
<http://news.independent.co.uk/low-res/story.jsp?story=452375&host=3&dir=75>
35. Ian Douglas "US Genocide in Iraq"  
<http://www.brusseltribunal.org/pdf/NotesOnGenocideInIraq.pdf> 2007

36. "Metal of Dishonor." Depleted Uranium Education Project, NY, USA 1997.
37. Bou -Rabee, F. "Estimating the Concentration of Uranium in Some Environmental Samples in Kuwait after the 1991 Gulf War." Appl. Radiat Vol. 46, No 4, pp 217-220, 1995. Elsevier Science Ltd. UK.
38. Al-Azzawi, S. et al, " Environmental Pollution Resulting from the Use of Depleted Uranium Weaponry Against Iraq During 1991, World International Conference on DU, Hamburg, Germany, 2003 [http://www.grassrootspeace.org/wuwc\\_reader2\\_science.pdf](http://www.grassrootspeace.org/wuwc_reader2_science.pdf) - p.41
39. (KSC), Kuwait Oil Company, "Physical damages to the Desert Surface", contract No. 93B2U2, ERU/6.5/03B, 1993.
40. Maguar, A.J. "Effects of DU Weapons on Human and Natural Environment in Selected Areas in Southern Iraq", M.Sc. Thesis in Environmental Engineering, College of Engineering, University of Baghdad, 1999.
41. International conference on DU, 2000, "Health, ecological, legal, and economic aspects of conventional radioactive weapons", committee of solidarity with the Arab Cause, Nov.,2000.
42. IAEA, "Measurement of Radionuclide in food and Environment." Vienna, Tech. Rep. No 1, 1981.
43. Al-Heli, W.M. "Effects of DU Weapons on Air and Soil Pollution in Southern Iraq", M.Sc. Thesis in Environmental Engineering, College of Engineering, University of Baghdad, Iraq. 1998.
44. Al-Saji, M. "Effects of radiological weapons on surface and groundwater quality in selection areas southern Iraq M.Sc. thesis in Environmental Engineering, University of Baghdad, Iraq, 1998.
45. Al-Azzawi, S., and Al Naemi, A., 2002, "Assessment of radiological doses and risks resulted from DU contamination in the highway war zone in Al-Basra governorate", proceedings of the conference on the effects of the use of DU weaponry on human and environment in Iraq, March 26-27 2002, Baghdad, Iraq.
46. William, D. "Hazards of Uranium Weapons in the Proposed War on Iraq" full report.. The Eos life resources center. Oct, 2002.
47. KOMURA, K., FUJITA, X, and FURKAWA, M. "Isotopic Ratio of Depleted Uranium Used in Iraq war". Japan Radiation Research, vol. 46, no. 429, page 193, 2003.
48. Dug Weir, "The facts on depleted Uranium", New internationalist, Nov, 2007.
49. William Van Den Panhuysen. "Belgium Bans Uranium Weapons and Armor". ISBUW, March 24, 2007.
50. ICBUW, "UN First Committee Passes DU Resolution in Landslide Vote" Nov. , 2007 <http://www.bandepleteduranium.org/>

51. Kimberly Bernard, Martia Butcher, Roy Farrell MD, Robert McGould MD, Michael McCally MD."DU: Health and Public Health Issues Arising from the use of Depleted Uranium Munitions". Physicians for social Responsibility, Oct 2005.
52. Korhler, R.C. "Spreading Cancer, Depleted Uranium turns Bush's lies into high-tech horror". <http://www.uruknet.info/> , June 27, 2006
53. Rosali Bertell "Depleted Uranium: All the questions about DU and Gulf War Syndrome are not yet answered". International Journal of Health Service 36(3), 503-520, 2006
54. A. Miller, et al. "Genomic instability in human osteoblast cells after exposure to depleted Uranium: Delay lethality and micronuclei formation". Journal of Environmental Radioactivity. vol.64(2-3), 2003 (PP 247-259).
55. A. Miller, et al, "Effect of the military-relevant heavy metal, depleted uranium and heavy metal tungsten-alloy on gene expression in human liver carcinoma cells (HepG2)." Mol. Cell Biochem. vol. 255(1-2). Jan. 2004 (PP. 247-56)
56. Chroder, H. et al. "Chromosome aberration analysis in peripheral lymphocytes of Gulf War and Balkans War veterans". Radiation Prot. Dosimetry. Vol. 103(3) 2003 (PP. 211-219).
57. Yaqoub, A., Ajeel, N., and Al-Wiswasy, M., 1998, "Incidence and pattern of malignant diseases (excluding leukemia) during 1990-1997", Proceeding of the conference on health and environmental consequences of DU used by U.S. and British forces in the 1991 Gulf War, Dec. 2-3, 1998, Baghdad, Iraq.  
[http://www.iraq.be/ned/archief/Depleted%20Uranium\\_bestanden/DEPLETED%20URANIUM-3-%20INCIDENCE.htm](http://www.iraq.be/ned/archief/Depleted%20Uranium_bestanden/DEPLETED%20URANIUM-3-%20INCIDENCE.htm)
58. Al-Sadoon, I., Hassan, J., and Yaqoub, A., 1998, "Incidence and pattern of congenital anomalies among birth in Basrah during the period 1990-1998", Proceeding of the conference on health and environmental consequences of DU used by U.S. and British forces in the 1991 Gulf War, Dec. 2-3, 1998.  
[http://www.iraq.be/ned/archief/Depleted%20Uranium\\_bestanden/DEPLETED%20URANIUM-1-%20INCIDENCE.htm](http://www.iraq.be/ned/archief/Depleted%20Uranium_bestanden/DEPLETED%20URANIUM-1-%20INCIDENCE.htm)
59. Yaqoub, A., et.al., 1999, "Depleted Uranium and health of people in Basrah: an epidemiological evidence; 1-The incidence and pattern of malignant diseases among children in Basrah with specific reference to leukemia during the period of 1990-1998", the medical journal of Basrah University (MJB�), vol.17, no.1&2, 1999, Basrah, Iraq.
60. Ammash, H., Alwan, L., and Maarouf, B., "Genetic hematological study for a selected population from DU contaminated areas in Basra." Proceeding of the conference on the effects of the use of DU weapons on human and environment in Iraq, Baghdad, Iraq 2002.
61. Sunday Herald, "WHO suppressed scientific study into depleted uranium cancer fears in Iraq". Feb 22, 2004
62. RIA Novoski "Iraqis blame US depleted Uranium for surge in cancer"
63. WEP, "Depleted Uranium in Kosovo Post Conflict Environmental Assessment". Geneva, 2001.