Environment Radiological Pollution from the Use of Depleted Uranium Weaponry Against Thi qar Governorate during 2003 War

Samir .M.Al-malky Majed .R.Al-Bahrani

Thi qar Univ/College Science /Dept of Physics

Thiqaruni.org

Abstract :

Since the USA and its allies have been used a new radiological weapons called the Depleted Uranium Projectiles against Iraq and its people during the occupation Iraq in 2003 , major environmental and human health problems have resulted from the use of these weapons. Thus, such problems and their possible sources should be investigate all over Iraq .

The exposure rates to external radiation were measured in 37 regions in the study area . by Inspector Radiation ALERT detector.made in USA .

The average of the exposure reading shows an increase as high as 80 and 85 µR.hr-1in Sumer region and Al kamessia region respectively, which indicates the presence of radiological pollution in the study area . These values are generally above the critical level .The internal and external doses of the people have been exposed to, are calculated and external exposure are found to be 80 m Sv and 85mSv respectively in Sumer region and Kamessia region.

المستخلص

منذ ان استخدمت الولايات المتحدة وحلفائهاالاسلحة الاشعاعية الحديثة والمتمثلة بقذائف اليورانيوم المنضب ضد العراق وشعبه خلال احتلال العراق في عام ٢٠٠٣ونجم عنه مشاكل صحية وبيئية وإنسانية لذالك يجب البحث والتحري عن تلك المواقع الملوثة في جميع انحاء العراق .

ان معدل التعرض للاشعاع الخارجي قيست في ٣٧ موقع شمل جميع اقضية ونواحي محافظة ذي قار التي تعرضت للقصف و باستخدام جهاز inspector Radiation ALERT detector made

وقد بينت قراءات ان معدلات التعرض بلغت$^{-1}$.h 80µR و $^{-1}$85µR.h في مناطق سومر والخميسية على التوالي وبذالك قد فاق الحد الحرج والذي يبلغ$^{-1}$µR.h 10 وتاكد تلك القراءة وجود التلوث الاشعاعي في المناطق قيد الدراسة. وان مقدار التعرض الخارجي بلغ 80mSv و85mSv في كل من الناصرية والخميسية .وهنالك مستودع للاسلحة الثقيلة مقصوف بقذائف اليورانيوم المنضب في الخميسية بلغت القراءة فيه $^{-1}$19000 µR.h أي قد فاق الحد المسموح عالميا ب 1900 مرة .

1.0 Introduction

Environmental radiological pollution means the release of radionuclide to the environment from different sources such as military use of nuclear weapons,
nuclear accidents, and nuclear tests These radionuclide are deposited on the ground and vegetation cover giving rise to external and they can be transferred
through food – chain to human body .

1.1 Radiological pollution by Depleted Uranium Weaponry

The US forces and its allies used Depleted Uranium Weapons for the first time during war in 1991 .These weapons should be prohibited due to their destructive effects on civilians and the environmental elements for thousands of year to come [1].
Depleted Uranium penetrates known as anti –tank armor –piercing projectiles . The U.S .Army claimed that more than 20000 large caliber DU
Rounds were consumed between 1991 to 2003 against Iraq [2] . The A-10 aircraft used these projectiles extensively against Iraqi armored vehicles and artillery .
The A-10 fired approximately 940000 ,30 mm Depleted Uranium projectile [3] Also , the Tomahawk cruise missiles launched from the first days of 1991 war ,
Then reused during the attach of September 1996 contain DU , Then reused during occupation of 2003 Moreover, 650 cruise missiles were launched to against military targets and industrial all over Iraq[4]
Depleted Uranium is a by-product of the Uranium enrichment process
"Depleted" Uranium is so called because the content of the fissionable U-235
isotope is reduced from 0.7 percent to 0.2 percent during the enrichment process[5].
The following are the major characteristics of DU metal[6]:

1. **DU is extremely dense (19000 kg.m^{-3}) ,(1.6) times more than lead and capable of penetrating heavily armored vehicles.**
2. **The pyrophoric nature of DU metal and the extreme flash temperatures are generated on impact lead to burn through the target armor.**

3.DU is a radioactive waste,which makes it cheap and useful as a shell and shield.
4.Its Half-life is (4.5*10^{9}) years.
5. Its specific activity is 12429 Bq.gm^{-1}.
Depleted Uranium is extremely hazardous to health because of its radioactivity and its toxic nature as a heavy metal[5] .
Depleted Uranium particles may remain in the lungs if they are inhaled and then travel in the blood stream and deposited in the brain , kidney, bone,reproductive organs, muscle and spleen[3] .Uranium compounds retained in the bone may cause malignant changes in the cells of the skeletal tissue,While DU retained in the respiratory tree may result in the induction of lung cancer[7]

2.0 Objectives of this study.

Subjected to DU containing been has Governorate Thi-qar
Weaponry shelling between the (1991 to 2003) war and the following
Re-aggression ; therefore, the goals of this research are :

1. **Detection of exposure rate and contamination of the radioisotopes related to DUcontamination resulted from the use of these weapons 2003 war.**
2. **Measurement and prediction of the environmental and human health damages in Thi-Qar Governorate including AL -kamesea region.**

3.0 Location

The study area includes most of Thi-qar governorate . Nasseriea is located at the part of Iraqas shown in fig.(1).It is bounded by latitudes 31.2 degree and longitudes 15.46 degree . The area is generally divided in to the central part of Nasseria city and the greater Nasseria area

4.0 Results and discussion

The exposure rates in the area ranged between (6- 80)µR.h^{-1}in Nasiriyah

And (10-19000) µR.h^{-1}in kamessia Region. It should be noticed that the average exposure rate was 6 µR.h^{-1} representing the back ground level of the study area .

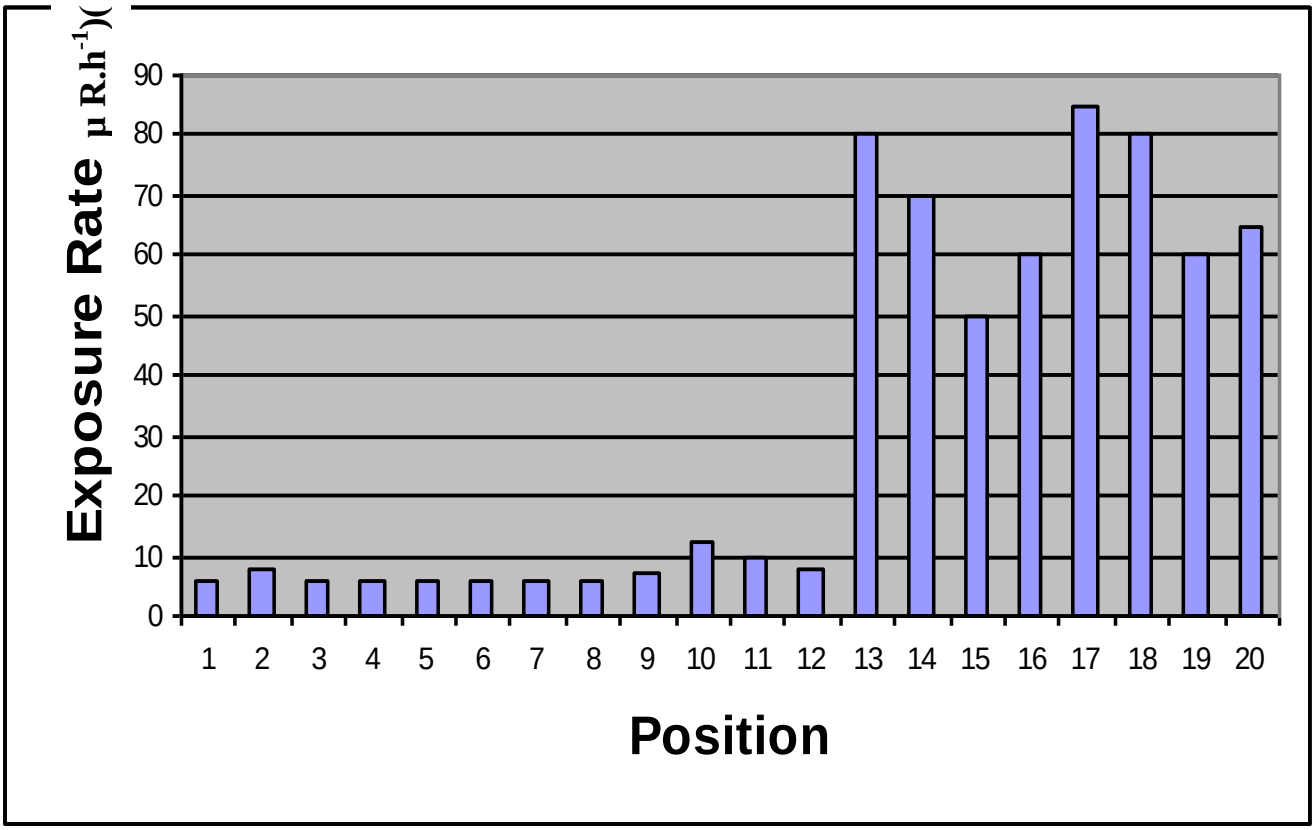
The results in table(1) and table(2) show an increase of the exposure rates in soil sample close from sets bombarded . The measured exposure rate in the study area evidence on existence Radiological Pollution in Heavily armored vehicles sets and sets bombarded are shown in figure (1) and figure (2) which are more than the critical level that amounted 10 µR.h^{-1} and which exceed the critical level by amount 1900 times The maximum value measured exposure rate is 80 µR.h^{-1}in An Nassiriyah City and 19000 µR.h^{-1} in kamesia region this is a major indication that the increase is due to the pollution of the study area by DU weaponry and that Kamesia region is significantly more polluted than Nassiriyah City due to the fact that the shelling has been more intensive on targets in Nassiriyah City because of existence very big arsenal Heavily armored vehicles in this region

Table (1)Exposure Rates in Different Selected Location in Thi qar Governorate and Kamessia region ($\mu R.h^{-1}$) as Measured in 2003.

NO	Sample symbol	Location	Exposure Rates($\mu R.h^{-1}$)
1	A1	Suq ash shukh	6
2	A2	Al fatlya	8
3	A3	AlHammar	6
4	A4	Al Fuhud	6
5	A5	Alislah	6
6	A6	AlChabish	6
7	B1	Al Gharraf	6
8	B2	Ashatrah	6
9	B3	An Nasr	7
10	B4	Ar Rifay	12
11	B5	Qalat Sukkar	10
12	B6	Al Fajr	8
13	C1	ConstellationSummer	80
14	C2	Corporation UR	70
15	C3	Drug Reliquary	50
16	C4	Command branch Thi qar	60
17	C5	Al kammesia region	85
18	C6	Bridge Al Basrah	80
19	C7	Tal Al laham	60
20	C8	Situation Al feda	65

Table (2)Exposure Rates in Different Selected Location in Kamessia region (μR.h^{-1}) as Measured in 2003.

NO	Sample symbol	Location	Exposure Rates(μR.h^{-1})
1	R1	Heavily armored vehicles	19000
2	R2	Store armory	25
3	R3	Store armory	22
4	R4	Store armory	19
5	R5	Store armory	17
6	R6	Store armory	15
7	R7	Store armory	15
8	R8	Store armory	15
9	R9	Approach to Store armory	13
10	R10	Approach to Store armory	13
11	R11	Distance from Store armory	10
12	R12	Distancefrom Store armory	10
13	R13	DistancefromStore armory	10
14	R15	Distancefrom Store armory	10



Figure(2) magnitude of Exposure rate to radiation (α,β) for position sample with in Thi qar Governorate .

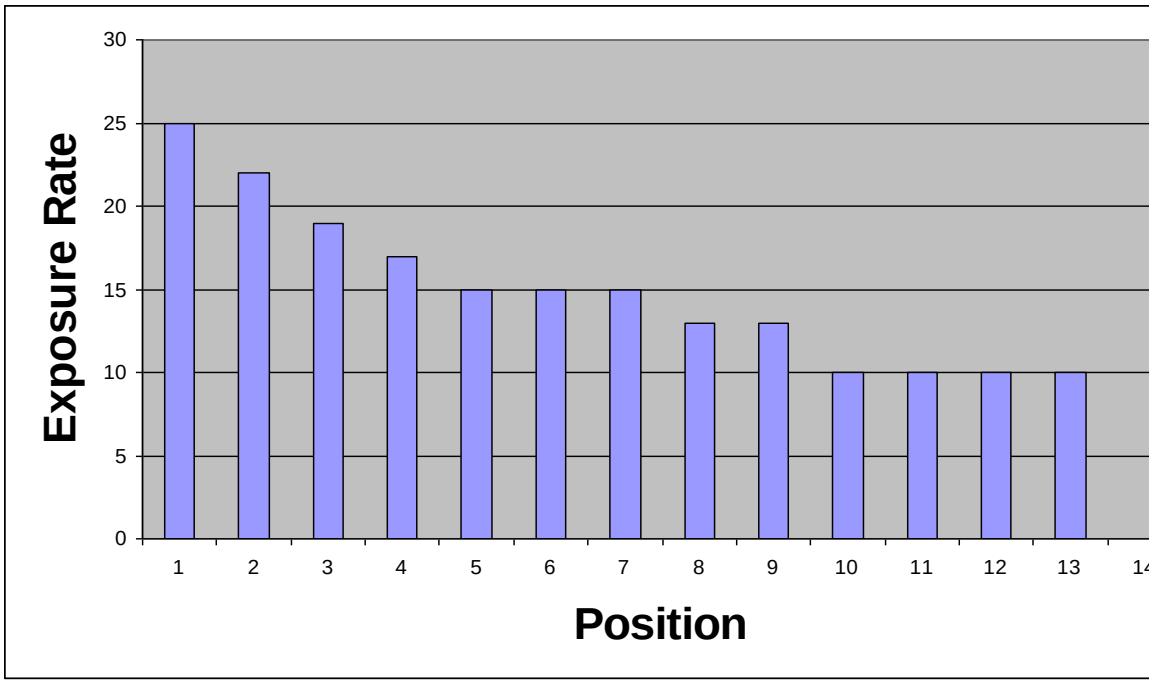


Figure (3) magnitude of Exposure rate to radiation (α ,β) for position Sample with in Kamesia region

5.0 Whole Body Dose

A whole body dose is the sum of two doses representing the external exposure (that results from those sources outside the human body)and the internal exposure.
For comparison purposes Table (3) shows the whole body dose for the adults from the natural sources in Thi-Qar Governorate

Dose limits for members of the public from new sources shoud not exceed (1 mS_v in year) .The ICRP (International Commission On Radiological Protection)states that the principle doselimit is that of the effective dose equivalent averaged overof a lifetime in asingle year(5 $mS_v.yr^{-1}$) [8].

Table (3)

Effective Dose Equivalent from Natural ources in Thi-Qar Governorate ($mS_v.yr^{-1}$)

External dose	Internal Dose				Whole Body dose
	Rn-222dose	Ingestion Due to Ra-226	Dose from other radionuclide ofU^{-238}decay	Natural dose from other radioactive elements in the earth crust	

			chain		
1.17	2.34	.082	2.758	.387	6.737

6.1 Conclusions

The field measurements using by using Inspector Radiation ALERT detector.made in USA .have provedthat there is clear radiological pollution in the study area . The measured average exposure rate is 80 μR.h^{-1}in An Nassiriyah City and 19000 μR.h^{-1}which are more than the critical level that amounted 10μR.h^{-1}.and which exceed the critical level by amount 1900 times and 23750 times the back ground level in Kamesia region we indicate that devoid people while in Nassiriyah City it is 8 times the critical level and 100 times the back ground level. The maximum value measured exposure rate is 80 μR.h^{-1}in An Nassiriyah City and 19000 μR.h^{-1} in kamesia region this is a major indication that the increase is due to the pollution of the study area by DU weaponry and that Kamesia region is significantly more polluted than Nassiriyah City due to the fact that the shelling has been more intensive on targets in Nassiriyah City because of existence very big a arsenal Heavily armored vehicles in this region

Reference المصادر

١) الدكتور كاظم المقدادي،ضحايا سلاح اليورانيوم المنضب ،"الشرق الاوسط" في29/5/2005

2) WHO,Environmentat Health Information, Depleted Uranium:Sources,Exposure and Health Effects,WHO/SDE/01.1.WHO,Fact Sheets,NO257,Reserved April,2001

3) D.Fahey "Case Narrative" Swards and Plowshares,USA,2004

4) S.N.AL-Azzawi(Mathematical Modeling of Radiogicalpollutants Transformation in Non-Living Environmental Path ways in Southern of Iraq):Arab Universities Journal of Engineering Science ;8,1-15,2003

5) D Fahey "Collateral Damage :How US Troops were Exposed to Depleted Uranium Education Project , "Metal of Dishonor".2nd . Ed.,International Action Center,(1999)

owski,G.,and Lopez,D., "Uranium Battle Fields Home and Abroad",Progressive 6) Buk Alliance for Community Empowerment ,New Mexico,(1993).

7) Al -Saleem T.,1977,Cancer in Iraq ,Med.J.,Vol.,No.4.

8) S.N.AL-Azzawi(Mathematical Modeling of Radiogicalpollutants Transformation in Non-Living Environmental Path ways in Southern of Iraq):Arab Universities Journal of Engineering Science ;8,10-25,2001

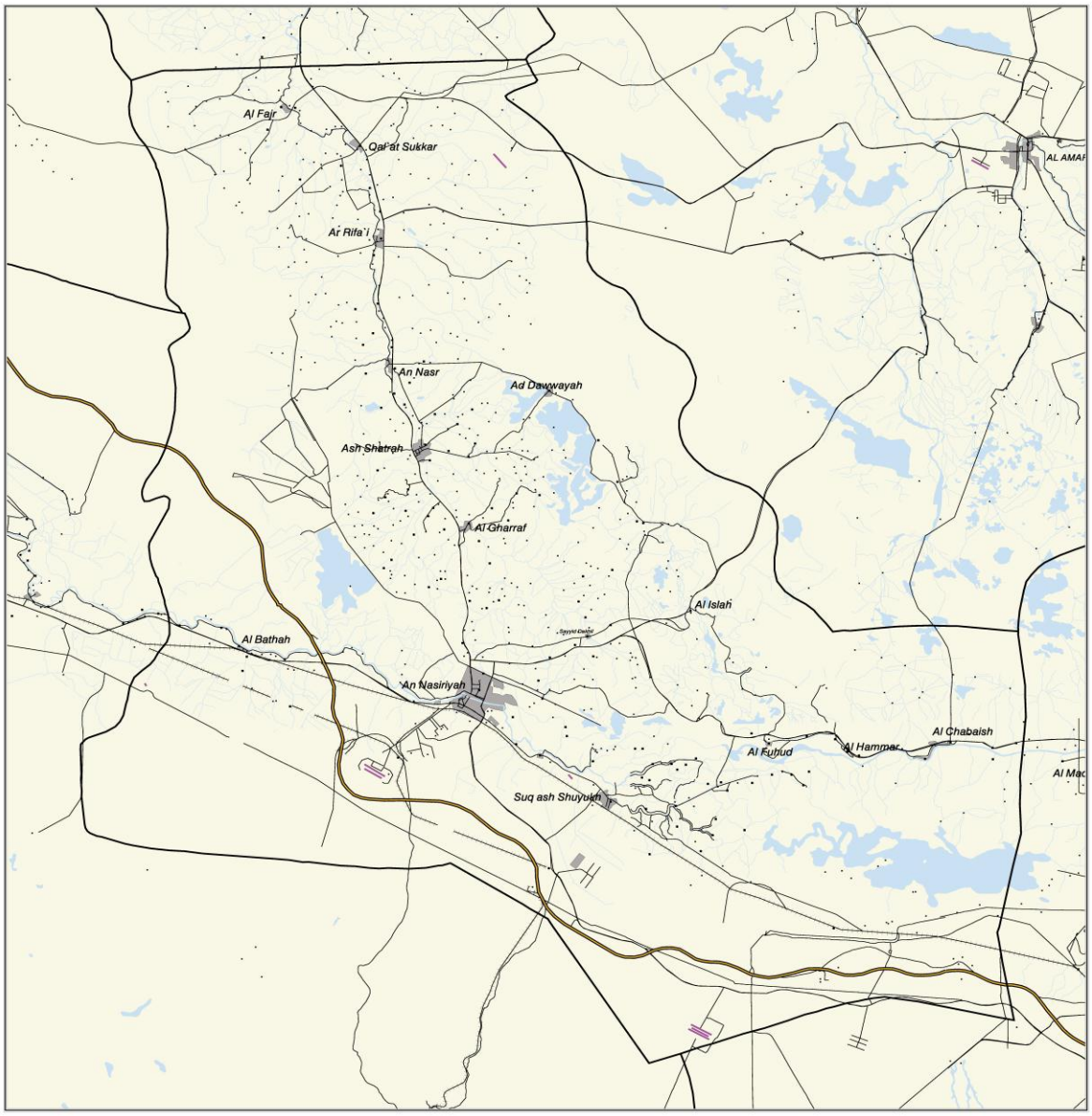


figure (1) Administrant map of Thi qar Governorate