

Depleted Uranium Follow-up Program

Presented by: Joanna Gaitens, PhD, MSN/MPH, RN
Director, Toxic Embedded Fragment Surveillance Center

Date of briefing: 29 June 2023

Depleted Uranium (DU) Overview

What is DU?

- By-product (waste) of the uranium (U) enrichment process through which U-235 (one of 3 isotopes) is extracted from natural U for use as nuclear fuel
- Approximately 40% less radioactive than natural U

Military uses for DU

- Tank armor for increased resistance to enemy projectiles
- Munitions to increase penetrating power
- Used in battle for first time in 1991 Gulf War



Gulf War Exposures to DU

- Friendly-fire incidents exposed United States soldiers to:
 - DU embedded fragments
 - Aerosolized DU oxides
 - Inhalation, ingestion, wound contamination
- Burning of munitions storage facility
- Decontamination of military equipment



Dual Mission of the DU Program

- Since 1993:
 - To provide clinical surveillance for the ‘friendly fire’ DU-exposed Gulf War 1 (GW1) Veterans
- Since 1998:
 - To provide urine DU surveillance by mail for any Gulf War 1 (GW1) & more recent Veterans concerned about DU exposure

Measurement of Urine Uranium Concentrations

- Measuring the uranium concentration in urine is the best way to assess uranium in the systemic circulation.
- We can measure total urine uranium concentrations in parts per billion.
 - Everyone has uranium in their urine from natural sources.
- We can also determine the U235/U238 isotopic ratio.
 - This allows us to distinguish if the uranium present is from a natural or a depleted source.

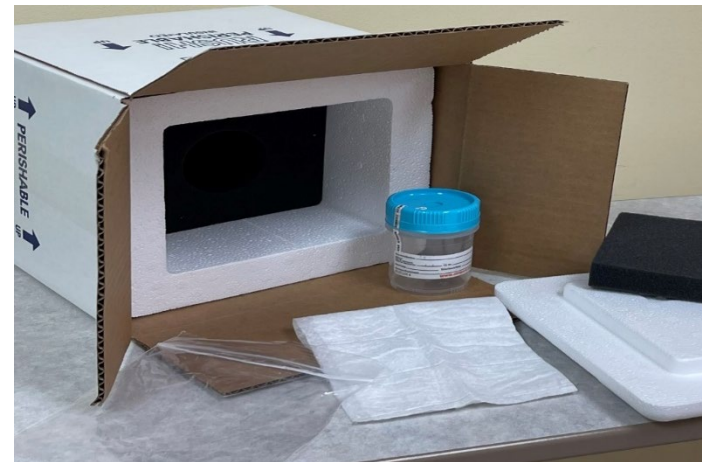
DU Mail-in Surveillance Protocol

- Local VA facilities:
 - Submit an Interfacility Consult to the DU Program at the Baltimore VA
 - Newly created in 2023 to make ordering and tracking easier for VA providers
 - Work with the Veteran to:
 - Obtain and submit a spot urine sample to the DU Program
 - Complete a DU Exposure Worksheet

Baltimore VA Medical Center



DU Urine Collection Kit



DU Urine Surveillance Results (as of January 1, 2023)

- Over 7,300 Veterans have submitted a urine sample to the DU Program.
- Of those who submitted a sample, 5 Veterans had a positive DU isotopic signature.
 - All were involved in ‘friendly-fire’ incidents and invited to enter the DU Follow-up program.

Potential DU Exposure at Karshi-Khanabad (K-2)



DoD site assessments:

- 2001 low radioactivity uranium identified
- 2002 site survey
 - “very small amounts of “processed” uranium, later identified as DU of non-U.S. origin present at an area outside of the perimeter of Camp Stronghold Freedom”
 - “No DU or other radioactive material found anywhere else”
 - “Contaminated area covered with clean fill in 2001, fenced and marked off limits”
- Uranium posed “minimal health risk”



DU Mail-in Worksheet Revised

- DU Worksheet used to help identify possible DU exposure scenarios
- K-2 added as a response option in August 2020

 Department of Veterans Affairs		DEPLETED URANIUM WORKSHEET	
Name		SSN	
AREAS			
10. Where did the veteran serve?			
	KUWAIT	Y = Yes N = No U = Unknown	<input type="checkbox"/>
	SAUDI ARABIA	Y = Yes N = No U = Unknown	<input type="checkbox"/>
	IRAQ	Y = Yes N = No U = Unknown	<input type="checkbox"/>
	KARSHI-KANABAD (K-2) UZBEKISTAN	Y = Yes N = No U = Unknown	<input type="checkbox"/>
	ONLY ON A SHIP (NOT ASHORE)	Y = Yes N = No U = Unknown	<input type="checkbox"/>
	OTHER	Y = Yes N = No	<input type="checkbox"/>
	IF YES, DESCRIBE OTHER AREA		
<input type="text"/>			

DU Surveillance of K-2 Veterans

- Any K-2 Veteran concerned about DU exposure can submit a urine sample to the DU program for testing.
- To date, 138 K-2 Veterans have submitted a urine sample to the DU program.
 - Identified using:
 - K-2 response added to DU Worksheet in August 2020
 - Responses to all open-ended questions on earlier versions of worksheet
- Of the 135 for whom we have results, no one has had a positive DU isotopic signature.