

Depleted Uranium in the Live Impact Area of Vieques

VIEQUES ENVIRONMENTAL RESTORATION PROGRAM **FACT SHEET**



SUMMARY

During training exercises in 1999, Marine Corps aircraft mistakenly expended 263 depleted uranium (DU) rounds (called penetrators) at the North Convoy Site of the Live Impact Area (LIA) on Vieques. Over the following year, the Navy completed three DU recovery operations and numerous radiation surveys in cooperation with the Nuclear Regulatory Commission (NRC) and the Puerto Rico Department of Health. The surveys indicated that members of the public were not exposed to radiation resulting from Navy training. With the cooperation and approval of the Puerto Rico Environmental Quality Board and the US Environmental Protection Agency, the Navy has performed additional radiological investigations in the LIA, under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as "Superfund."

Except for the single training exercise in 1999 involving Depleted Uranium (DU) penetrators, the Navy did not use radioactive munitions on Vieques. DU penetrators are made of solid metal, and they do not contain explosives.

Background

On February 19, 1999, 263 rounds of DU ammunition were mistakenly expended during a training exercise. On March 5, 1999, the Navy reported the incident to the Nuclear Regulatory Commission (NRC). During 1999 and 2000, the Navy completed three DU recovery operations in accordance with work plans approved by the NRC. Recovery teams found some of the DU penetrators intact, while others were broken into fragments. In order to get an accurate count, the fragments were pieced together to form equivalent penetrators that matched the size and shape of whole, unbroken penetrators.



DU bullet (also called a "penetrator") next to pliers shown for size comparison. DU bullets do not contain explosives.

It was estimated that 116 equivalent penetrators were recovered. In cooperation with the Puerto Rico Department of Health, NRC staff performed numerous radiation surveys and collected soil samples from the area impacted by DU. The NRC also collected soil, vegetation, water, and sediment samples in areas accessed by the general public and in nearby towns. Based on their independent sampling, the NRC concluded that members of the public outside of the LIA were not exposed to the DU that was fired into the LIA.

This conclusion was verified by the Agency for Toxic Substances and Disease Registry (ATSDR) in their 2003 Public Health Evaluation for Vieques, which said, "The very low levels of radiation released by depleted uranium at the LIA do not present health hazards."

What is uranium?

Uranium is a weakly radioactive metal that is naturally present in nearly all rocks, soil, water, air, plants, and animals. In a typical dump truck load of soil, there is approximately half a teaspoon of uranium.

How is depleted uranium different from natural uranium?

Natural uranium is a mixture of 3 types (or isotopes) of uranium, referred to as U-234, U-235, and U-238. In processing uranium for industrial uses, the relative amounts of each isotope can be changed. If the portion of U-235 is decreased, it is called depleted uranium (DU). The radioactivity of DU is about 60% less than the radioactivity of natural uranium. The main civilian uses of DU are for counterweights in ships and aircraft, radiation shields in medical equipment, and containers for transporting radioactive materials.

Where was depleted uranium used on Vieques?

The DU penetrators were fired at the North Convoy Site within the Live Impact Area (LIA) on the eastern end of Vieques. The North Convoy Site is approximately 8 miles east of the towns of Isabel Segunda and Esperanza.

Have the people of Vieques been exposed to depleted uranium?

The NRC concluded that, “members of the public outside the LIA could not have been exposed to the DU that was fired into the LIA (NRC, 2000).” This conclusion was based on a comprehensive inspection in June 2000 to determine whether depleted uranium had contaminated the surrounding environment. The NRC inspectors worked with representatives of the Radiological Health Division of the Puerto Rico Department of Health to collect 114 samples of soil, vegetation, surface water, and sediment in the following areas:

- The North Convoy Site where the DU rounds were fired, and each of the camps established by protestors who occupied the range for approximately one year. The protestor camps were approximately one-half mile from the North Convoy Site.
- The nearby Eastern Maneuver Area, including beaches along the north and south shorelines where the public had been granted access.
- Public areas, including roadsides, rural areas, public recreation areas, and neighborhoods within the towns of Isabel Segunda and Esperanza. These public areas of Vieques are approximately 8 miles from the North Convoy Site.



North Convoy Site within the Live Impact Area of Vieques

No depleted uranium was detected outside the LIA. Within the LIA, elevated levels of uranium were detected only in five soil samples collected in the holes where DU penetrators were found. The NRC findings are consistent with conclusions reached by the United Nations Environment Programme (UNEP) regarding the use of DU penetrators in Kosovo in 1999 (UNEP, 1999). Both the investigations by NRC in Vieques and UNEP in Kosovo indicate that DU penetrators affect radiation levels in a very small area (up to 12 inches from the penetrator), with no impacts observed even short distances away.

Why didn't the Navy remove all of the depleted uranium during the original cleanup?

Since DU penetrators are very heavy and penetrate the soil, they are not visible on the ground surface and must be detected using radiation sensors. During the original cleanup in 1999 to 2000, the Navy removed all of the DU penetrators that were detected. The unrecovered DU penetrators may have penetrated the soil to

a depth where they could not be detected. In 2013, as part of the ongoing cleanup on Vieques, the Navy performed an additional radiation survey of the North Convoy Site and identified 27 locations (approximately 1 foot in diameter) with elevated levels of radioactivity. In 2018, 29 equivalent DU penetrators were recovered as part of the ongoing cleanup effort.

Did the depleted uranium become airborne and blow downwind to the residential areas of the island?

Environmental sampling has shown that depleted uranium has not been transported to the residential areas of Vieques. Based on the June 2000 investigation by the Nuclear Regulatory Commission (NRC) and the Radiological Health Division of the Puerto Rico Department of Health, the NRC concluded that "...there was no spread of DU contamination to areas outside of the LIA and that contamination from the DU inside the LIA was limited to the soil immediately surrounding the DU penetrators" (NRC, 2000).



Radiological survey



Ludlum Model 19 with a 1" by 1" sodium iodide probe

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Has depleted uranium entered the groundwater on Vieques?

Groundwater samples indicate that depleted uranium (DU) has not entered Vieques groundwater. Groundwater is not used as drinking water on Vieques because all Vieques drinking water comes from mainland Puerto Rico.

References

1. Nuclear Regulatory Commission (NRC), 2000, *NRC Inspection Report Concerning the Environmental Survey at Vieques Island, Puerto Rico*.
2. Agency for Toxic Substances and Disease Registry (ATSDR), 2003, *Public Health Assessment Air Pathway Evaluation, Isla de Vieques Bombing Range, Vieques, Puerto Rico*.
3. United Nations Environment Programme (UNEP), 1999, *The potential effects on human health and the environment arising from possible use of depleted uranium during the 1999 Kosovo conflict. A preliminary assessment*. United Nations Environmental Programme and the UNCHS Balkans Task Force.

PRACTICE THE **3Rs** OF MUNITIONS SAFETY

For your safety, pay attention to all warning signs and locked gates, stay out of restricted areas, and practice the 3Rs.



RECOGNIZE when you may have come across a munition, and that munitions are dangerous.



DO NOT approach, touch, move, or disturb a suspected munition, and carefully leave the area.

At sea, **DO NOT** bring a suspected munition alongside or on board a vessel.



On land, **CALL 911 OR (787) 741-2020** and tell the authorities what you saw and where you saw it.

At sea, notify the US Coast Guard (USCG), **CHANNEL 16 – 156.800 MHZ**. Use World Geodetic System 1984 (**WGS-84**) for reporting.