Military Uses of Radium-226

This enclosure summarizes information provided to the staff by the military services on military uses of radium-226, number of military installations with radium-226, and military views on the potential jurisdiction clarification.

Uses and Activities

Each of the military services provided the U.S. Nuclear Regulatory Commission (NRC) with information about past and current uses and activities involving radium-226. Excerpts from this input are as follows.

Air Force regulations prohibit the purchase of new systems or items containing radium-226. All currently known uses of radium-226 are a result of legacy programs, vehicles, and aircraft. There are several models of older aircraft, still in use, which contain dials and gauges with radium-226. Additionally, the Air Force has numerous static displays of aircraft and military vehicles containing radium-226. Decontamination activities are conducted that involve aircraft components containing radium-226, that support foreign military sales, aircraft part removal/recovery, private sales, storage, preparation for museums, and disposal. These activities are currently authorized under Air Force Radiation Material Permits (not NRC Master Materials License permits). There are also cases where targets on operational ranges may contain radium-226, although this practice also requires an Air Force Radiation Material Permit.

The Army stopped fielding radium-226 in approximately 1970; however, because of the large number of products, many items are still in inventory. Additionally, radium-226 is still found on targets on Army ranges. While current Army rules require any hazardous material to be removed from a vehicle prior to use as a target, many legacy vehicles used as targets on ranges still contain radium-226. The Army currently has 3,050 distinct types of items it has identified as containing radium-226. In many cases several types of items may be present on any one major item. These items are managed by means of a stock number associated with a specific item.

The Navy stated that it has no military operational radium-226 currently in use for warfare, combat, battlefield missions, or training for battlefield missions. In addition, the Defense Logistics Agency and the Navy supply systems do not issue any items containing radium. The Navy has considerable amounts of radium-226 at current and former shipyards, naval air stations, bombing ranges or research facilities. Examples of where radium-226 can be found include:

- Actual radioluminescent devices inadvertently left in storage or in museum or static displays;
- Residual contamination from the refurbishment process (contamination in buildings, sanitary and storm sewers, and storm drain outfalls);
- Sites where the radium-226 devices and the residue from refurbishment were processed and disposed (contaminated slag, incinerator waste, disintegrated or degraded devices, and contaminated soil in burials);
- Residual contamination from maintenance of vehicles or equipment with radioluminescent devices;

- Vehicles or equipment with radioluminescent devices used as targets on bombing ranges; and
- Facilities that conducted experimentation with radium-226.

A primary military activity today involving radium-226 is the remediation of military bases that have been identified as part of the Base Realignment and Closure (BRAC) process so that base property can be transferred to local governments or others and redeveloped for public use. For these BRAC bases, various remediation activities involving radium-226 as well as other radiological and hazardous chemical contamination are being planned or conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. Radium-226 contamination also exists on some active military bases that are not under the BRAC process, and the material remains under the military's control. Parcels on some active bases are being remediated and others could be remediated in the future. Remediation on active bases is conducted under the military's Installation Restoration Program, which is required to use the CERCLA process.

Another military activity involving radium-226 is the storage of items and equipment containing radium-226. Some of the equipment such as vehicles and aircraft are decontaminated by removing dials and gauges containing radium-226 so that the vehicles and aircraft can be released and sold to the public.

Number of Sites

The staff obtained information from the three military services regarding the estimated number of sites with only confirmed radium-226 contamination. Currently, 12 sites have been identified. There are additional sites with suspected contamination based on historical uses of radioactive material at the site. Should the recommendation for radium jurisdiction be approved by the Commission, the staff would request a list of suspected sites.

The Navy's September 2010 site list identified seven sites with confirmed radium-226 contamination. These sites are currently under investigation or remediation. One of these sites is a BRAC site that is not listed on the National Priorities List (NPL) and that would be eventually closed and transferred to a non-military owner after remediation is completed. The six remaining sites are located on active installations, and five are on the NPL and one is not listed on the NPL. The Navy believes at this time that these seven sites only contain radium-226 and no other radionuclides. The Navy list also identified 11 other sites where radium-226 is commingled with other radionuclides that are under NRC's jurisdiction (e.g., strontium-90 and depleted uranium).

The Air Force's November 2010 site list identified five sites with only confirmed radium-226 contamination. Two of these are BRAC sites, one is on the NPL list and one is not. The remaining three sites are on active installations; two are on the NPL and one is not on the NPL.

The Army's November 2010 site list response did not identify any sites with confirmed radium-226 contamination.

Views on Potential Jurisdiction Clarification

The staff has had several interactions with the military services regarding the jurisdiction of radium-226 since the Naturally Occurring and Accelerator Produced Radioactive Material rule was finalized in 2007. The Navy indicated that it looks forward to working with the NRC on developing protocols for implementation of NRC jurisdiction of radium-226 under military control. The Air Force concurs that NRC should have jurisdiction of radium-226 when the activity is not categorized as having military operational use. The Army supports NRC's jurisdiction for non-commodity items, such as radium contamination, and only those commodity items that the Army considers are no longer intended for use in military operations. However, the Army believes that requiring a license for the period of time in which such items are in holding and waiting disposal results in a cost with no appreciable gain in public health and safety.