



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
2405 GUN SHED ROAD
JOINT BASE FORT SAM HOUSTON, TX 78234-1223

JUN 01 2015

ATTN: Document Control Desk
Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
Mailstop T8 F5
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Deputy Director:

Reference US Nuclear Regulatory Commission (NRC) license number SUC-1593 (docket 040-09083) issued to HQ US Army Installation Management Command for possession of residual depleted uranium (DU) at Schofield Barracks and Pohakuloa Training Area in Hawaii.

Enclosed is information supporting a categorical exclusion for possession of depleted uranium military munitions [Title 10, Code of Federal Regulations, Part 51, §51.22(c)(14)(xv)]. This information is provided separately from the license amendment application in accordance with direction provided by the NRC.

My point of contact for the enclosed information is Mr. Tom Bucci, who may be reached at (210) 466-1645 or thomas.p.bucci.civ@mail.mil.

Sincerely,

David D. Halverson
Lieutenant General, US Army
Commanding

Enclosure

NMSSO1

U.S. ARMY EVALUATION OF PROPOSED ACTION RELATIVE TO COMPLIANCE WITH THE NATIONAL
ENVIRONMENTAL POLICY ACT (NEPA)

ISSUANCE OF A SOURCE MATERIAL POSSESSION ONLY LICENSE TO THE U.S. ARMY FOR POSSESSION OF
DEPLETED URANIUM FROM SPENT SPOTTING ROUNDS

1. In accordance with the guidance in NUREG-1748 "Environmental Review Guidance for Licensing Actions Associated with Nuclear Materials Safety and Safeguards Programs," Appendix B (August 2003), the U.S. Army believes that the proposed action, to issue a license to the U.S. Army for possession of depleted uranium (DU) from spent spotting rounds from the Davy Crockett weapon, qualifies for the categorical exclusion (CATX) at 10 CFR 51.22(c)(14)(xv), "[p]ossession, manufacturing, processing, shipment, testing, or other use of depleted uranium military munitions," and provides the following information in support of that conclusion. The Army believes that there are no special circumstances precluding the application of a CATX, including the circumstance where the proposed action involves unresolved conflicts concerning alternative uses of available resources within the meaning of section 102(2)(E) of NEPA [10 CFR 51.22(b)].

2. NUREG-1748, Appendix B, provides a checklist and series of basic questions for documenting qualification of a CATX. The Army staff's responses to the checklist and basic questions in NUREG-1748 for this proposed action are summarized below. The Army's responses were adopted, in part, from the NRC's finding on October 8, 2013, that the issuance of a license to the U.S. Army for possession of DU from spent spotting rounds at Schofield Barracks, Hawaii, qualified for application of the CATX at 10 CFR 51.22(c)(14)(xv) [Memorandum entitled "STAFF COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT FOR ISSUING A LICENSE TO THE U.S. ARMY FOR POSSESSION OF DEPLETED URANIUM FROM SPENT SPOTTING ROUNDS – DETERMINATION OF CATEGORICAL EXCLUSION (Docket 040-09083), dated October 8, 2013]. In adopting the responses, the Army included additional information to support the assertion that the CATX is similarly applicable to the proposed action to license the Army's DU possession at the locations listed below.

(a) Initial checklist items:

(i) Action Name: License application for U.S. Army possession of DU.

(ii) Action Locations: U.S. Army installations at which DU exists as a result of firing the Davy Crockett weapon; specifically: Forts Benning and Gordon (Georgia), Forts Campbell and Knox (Kentucky), Fort Carson (Colorado), Fort Hood (Texas), Joint Base Lewis-McChord and Yakima Training Center (Washington), Fort Bragg (North Carolina), Fort Polk (Louisiana), Fort Sill (Oklahoma), Fort Jackson (South Carolina), Fort Hunter-Liggett (California), Fort Greely (Alaska), Fort Dix (New Jersey), Fort Riley (Kansas), and Schofield Barracks and the Pohakuloa Training Area (Hawaii).

(iii) Action Description: Issuance of a source material possession only license to the U.S. Army for possession of DU from spent spotting rounds.

(iv) CATX Category: 10 CFR 51.22(c)(14)(xv), "Possession, manufacturing, processing, shipment, testing, or other use of depleted uranium military munitions."

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(b) Basic questions A-E, and Army responses:

A. Is the action consistent with the Statements of Consideration for the categorical exclusion chosen?

Army response: Yes, the Army believes the action is consistent with the Statements of Consideration (SOCs) for the CATX at 10 CFR 51.22(c)(14)(xv). The SOCs include "possession.... of depleted uranium munitions including e.g., bullets and other projectiles." The Army has requested authorization to "possess" the spent spotting rounds and fragments from the Davy Crockett weapon system. The Davy Crockett spotting round is a military munition and is a projectile. The DU portion of the Davy Crockett projectile is about 190 grams of DU per spotting round. Thus, the "possession" of a "projectile" discussed in the SOCs is consistent with the Army's request to possess the DU portion of the spotting round.

The SOCs refer to the testing of the DU munition and describe the locations of the testing as remote areas such as deserts on military reservations, oceans, and enclosures. In the Army's license application, the intended "use" by the Army of the DU from the Davy Crockett is not for testing. Rather, it is authorization to possess material that is already in the environment, and has been in the environment for many years. Therefore, the discussion of testing of the round is not germane to the proposed action; i.e. authorization to possess the DU. It is important to note that the areas that will contain the spent spotting rounds and fragments are controlled by the Army for unexploded ordnance and other materials, or are restricted ranges and are not entered without specific authorization from the Army (meaning that these areas are **not** open to the public). Thus, while the discussion of the locations of testing is not germane to the intended use by the Army, it is relevant to the concept that the material is not readily accessible to unauthorized individuals or the public; therefore, radioactive releases to the environment that could affect human life are negligible.

The SOCs discuss the chemical/physical form of the DU and state that the radioactive content is low, highly dispersed (i.e., the locations of the rounds are widely separated), and the DU is not readily incorporated into flora or fauna. This is the rationale for concluding that releases to the environment are negligible and that possible exposure to the DU are so low that personnel monitoring is not necessary. Since the DU from the spent spotting rounds is of a small quantity (less than ½ of a pound) and will be widely dispersed on the ranges, it is consistent with the SOCs.

Finally, the spotting round did not explode on contact and was not fired into a hard target. Rather, the round was fired at a distant target and, while the spotting round did contain a small marking charge in the projectile nose, which could fracture the DU portion of the round, cratering or defacing of the environment was minimal and the dispersal of the round in the environment was not as extensive as a round fired into an armored target.

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B. Is the action likely to significantly affect any aspect of the natural environment?

Army response: No, the Army does not anticipate any significant impact to the natural environment. The action being undertaken by the staff is to authorize the possession of the DU. It does not include using the DU for any purpose, nor will it authorize the decommissioning of the ranges in which the DU has been deposited without further NRC authorization (removal of incidentally identified fragments will be allowed). Authorizing possession (by the issuance of the license) will not change or affect the current environmental situation because the DU is already present and was deposited in the environment almost five decades ago. Thus, the Army anticipates that the proposed action will have no effect on the environment.

The Army took a hard look at three particular issues: (1) the potential migration of DU through soil, air, or water; (2) the potential for incorporation into flora and fauna, including any pathway that could result in impact to human health and safety; and (3) the potential for increased opportunities for migration of DU and plant, animal, and human uptake as a result of the use of high explosive ammunition (HE) on Army ranges and training areas.

The Army anticipates the potential for significant migration of DU through soil, air, and water to be very low. The Army has conducted extensive testing of DU oxidation and its potential to spread to the surrounding environment, and has collected substantial data regarding the dispersion of DU penetrators and fragments, the circumstances that may cause DU penetrators to oxidize to powder, and both experimental and monitoring data of DU particle transport in air, surface waters, and through soil. In general, the studies conclude that site-specific conditions such as soil PH, humidity, and carbonate content may predict environmental corrosion of DU, and that atmospheric, hydrologic, and geochemical factors significantly influence the fate of DU in the environment. [See, e.g., *Review of Depleted Uranium Soil Contamination and Environmental Migration: Oxide Generation, Characteristics, and Dispersion*, U.S. Army Institute of Public Health, July 2012.]

Fort Benning, Georgia, is illustrative of an installation at which the environmental conditions may be most conducive to potential migration of DU. Fort Benning is a relatively wet environment, with soils that have relatively higher organic content, higher water holding capacity, and a higher potential for erosion than the other installations named above. [See, e.g., *Environmental Assessment for Fort Benning Integrated Natural Resource Management Plan*, Fort Benning Directorate of Public Works, June 24, 2014, available here: http://www.benning.army.mil/garrison/DPW/EMD/Content/PDF/3%20-%20FINAL%20INRMP%20EA_24JUN14.pdf; last accessed March 13, 2015.] Accordingly, it is reasonable to anticipate that, when compared to a drier desert environment, the potential for migration of DU may be higher at Fort Benning. In fact, the Army has not found significant migration of DU at Fort Benning from the areas into which the Davy Crockett spotting rounds were fired. Uranium contamination was

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studied at Fort Benning along with other “Munition Constituents of Concern” (MCOC) [such as copper, lead, and antimony]; because results for total uranium fell below the conservatively defined limits for the study, isotopic analysis was not conducted. Based upon analyses of soil, surface and ground water, sediment, and benthic macroinvertebrate sampling at Fort Benning, the Army has concluded that there is minimal risk of migration of DU out of the operational range areas. [See, generally, *Final Operational Range Assessment Program Phase II Quantitative Assessment Report, United States Army Garrison Fort Benning, Georgia*, ARCADIS/Malcolm Pirnie, September, 2012, at page ES-3.]

The Army anticipates the impacts to livestock and human health to be negligible, based upon the analysis contained within the Army’s “Bounding Calculations Using RESRAD 7.0,” included in the Army’s DU license application, specifically the calculations based upon the “resident farmer” scenario. The intent of this hypothetical scenario is to calculate the maximum possible exposure from DU for an individual who resides in the Radiation Controlled Area (RCA). The resident farmer breathes the air, drinks the water, and eats the plants within the RCA. We also assume the resident farmer ingests animal products grown onsite, using feed and water from potentially contaminated sources. The Fort Benning scenario of 9,700 rounds in one RCA is the “worst case” scenario possible given the number of DU rounds shipped to and fired at any one installation. (This concentration is highly unlikely, as Fort Benning has eight RCAs, and there is no reason to believe that all 9,700 rounds would have been fired at one RCA; nevertheless, this is the highest possible concentration of DU that could be present in one RCA.) The Army’s bounding calculations for 9,700 rounds fired within a one square kilometer RCA at Fort Benning, Georgia, resulted in a maximum annual dose of approximately 0.28 millirem in the first year. By comparison, an X-ray of the hand or foot provides a dose of 0.5 millirem; a dental x-ray provides 1.5 millirem [see: <http://www.nrc.gov/about-nrc/radiation/around-us/doses-daily-lives.html>]. Though there are some differences between impacts of “whole body” doses versus doses targeted at a part of the body, these comparisons are provided as an approximation of the dose in commonly understood terms. In addition, the maximum annual dose for the resident farmer scenario at Fort Benning of 0.28 millirem is a miniscule fraction of the 25 millirem regulatory level set for unrestricted use of a given site [see 10 C.F.R. 20.1402], and accordingly represents only a tiny additional risk when compared against background radiation. The contamination levels expected in air and water under the Fort Benning scenario are far below applicable standard for those media [see: Cherry, Robert, *Bounding Calculations Using RESRAD 7.0*, 1 June 2015].

The Army anticipates the potential for incorporation into flora and fauna, including the likelihood of any pathway leading to an impact on human health and safety, to be minimal. In general, this conclusion is based upon both biosphere modeling and actual flora and fauna sampling at Army installations. Biosphere modeling allows for estimated calculations of radionuclide concentrations in plants, as well as the resulting contamination of animals that forage on contaminated plants. [See, e.g., *A Biosphere Sensitivity Analysis Using BDOSE™ Version 2.0*, Center for Nuclear Waste Regulatory Analyses, March

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2011, at pages B-6 to B-7.] The Army also relies upon some actual sampling data taken from installations across the Army. These data showed flora and fauna samples to be below action levels for DU. [See, e.g., *Review of DU Soil Contamination and Environmental Migration: Oxide Generation, Characteristics, and Dispersion*, U.S. Army Institute of Public Health, July 2012.] As explained in detail below in the site-specific section about Fort Hood, which permits cattle grazing within its RCA, the Army's calculations utilizing the "resident farmer" scenario and bounding case assumptions resulted in negligible impacts to livestock and human health.

The Army anticipates that air migration resulting from HE fire in or near RCAs would be negligible, based on calculations that demonstrate that, even under "worst case" conditions, HE use in an RCA is anticipated to result in DU concentration in air far below NRC effluent limits. In addition, air sampling in Hawaii has failed to detect DU during routine contractor survey and construction operations, during controlled range burns, and during limited HE fire in a training exercise. [See: Cherry, Robert, *Plausibility Arguments Against Air Sampling During HE Fire into RCAs*, 1 June 2015.] The site-specific information for installations provided below includes facts about whether HE is fired into installation RCA(s), as well information about the location of "Surface Danger Zones" (SDZs) for HE. SDZs are personnel exclusion areas identified to protect people from weapons firing during training. The installation sections below state whether the RCA is within the SDZ for any HE fire; meaning, whether the potential DU contamination in a given RCA is subject to an enhanced potential for migration due to the nearby use of HE munitions. The Army finds the anticipated impacts to the environment as a result of potential HE fire into or near the RCAs to be miniscule. As a result of all the information provided herein and presented within the Army's license application, the Army does not anticipate the need for additional, supplemental, site-specific NEPA analysis prior to resumption of HE firing into or near any or all of the RCAs within the installations covered by this licensing process. The Army intends to resume fire of HE into and near RCAs upon grant of this license.

In addition to the three particular issues discussed above, the Army also evaluated the anticipated impacts of the proposed action on natural and cultural resources, including all of the resource areas typically analyzed within a NEPA analysis. Specifically, the Army took a hard look at the following resource areas: threatened and endangered species and other biological resources, cultural resources, water resources (including surface, ground water, and wetlands), soil and geology, air quality (including greenhouses gases and dust), noise, socioeconomics, land use, traffic and transportation, facilities and utilities, hazardous materials/hazardous waste/toxic substances, and airspace. Where applicable for some resource areas, the Army focused on impacts expressly anticipated by the SOCs for the CATX at 10 CFR 51.22(c)(14)(xv) [also referenced above, and originally set forth at 49 FR 9378].

After careful consideration, the Army has concluded that certain resource areas are susceptible to programmatic analysis; that is to say, the anticipated impacts on these resources from the possession of

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DU would not be expected to differ at the various locations that would be covered by the license, or that there would be no conceivable impact to these resources at any location. These resources are: (1) air quality; (2) noise; (3) socioeconomics; (4) land use; (5) traffic and transportation; (6) facilities and utilities; (7) hazardous materials/hazardous waste/toxic substances; and (8) airspace. The rationale for this conclusion is explained below for these resources.

(1) Air quality: Due to the weight of DU even when oxidized, reduced to dust, or aerosolized due to HE fire, it is not anticipated that migration of DU by air would constitute a significant impact to air quality. As noted in the SOC's, any such material released in this manner would be of such low radioactive content and so highly dispersed that a measurable impact to air quality, particularly outside of the RCAs, would be extremely unlikely. These conclusions are borne out both by the Army's bounding calculations and by actual air sampling during activities causing disturbance in the RCAs, as described above. This would be true even for RCAs that are relatively close to the installation boundary; although, due to their use as impact areas on active training ranges, most of the RCAs are well inside the boundaries of the installations. No impact to greenhouse gas emissions is anticipated to result from the proposed action.

(2) Noise: The noise from the firing of the Davy Crockett weapon system, which caused the DU to exist within the RCA at installations subject to this proposed action, occurred approximately 50 years ago. No additional noise is anticipated to result from the proposed action. Installations manage noise from range operations through an Installation Operational Noise Management Plan and would continue to do so under the proposed action.

(3) Socioeconomics: No impact to socioeconomics is anticipated from the proposed action, apart from an extremely minor potential beneficial impact to socioeconomics within the Regions of Influence of installations at which license conditions require testing or other work that could be procured and performed by local or national companies doing business with the Army.

(4) Land use: The RCAs on the installations that would be subject to the proposed action are all existing active training and range areas. The land use for the RCAs and surrounding areas would not change as a result of the proposed action.

(5) Traffic and transportation: The Army anticipates no impact whatsoever to traffic or transportation from the proposed action.

(6) Facilities and utilities: The Army anticipates no impact whatsoever to facilities or utilities from the proposed action.

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(7) Hazardous materials/hazardous waste/toxic substances: Installations are required to manage hazardous materials, hazardous waste, and toxic substances in accordance with a hazardous materials management plan. Apart from the DU itself, which will be managed in accordance with the terms of the NRC's license, the proposed action will have no effect on installations' management of other hazardous materials, waste, or toxic substances.

(8) Airspace: The Army anticipates no impact whatsoever to facilities or utilities from the proposed action.

The Army concluded that the proper analysis of the remaining natural resource areas: threatened and endangered species and other biological resources, water resources (including surface, ground water, and wetlands), soil and geology, and cultural resources, required site-specific information. After a hard look at these resource areas, below is detailed site-specific information about these resource areas for each installation that would be subject to the proposed action. Unless otherwise noted, the information provided is specific to the installation's RCA(s). Also included is information about any other resource areas that have the potential to be impacted by the proposed action due to site-specific conditions, as well as information about the closest residential human habitation, whether HE is used and whether the RCA(s) are in the SDZ for HE munitions, and whether/how often personnel enter the RCA(s) and for what reason(s). Several installations reported that personnel periodically enter the RCA for maintenance purposes, and that is expected to continue. The Army anticipates impacts to human health from these activities to be negligible, and will follow the Radiation Safety Plan and Physical Security Plan included in the license application materials for this action to reduce any potential for human health impacts at all installations.

(1) Fort Benning:

a. The only threatened/endangered species known to occur within Fort Benning's RCAs is the Red Cockaded Woodpecker (*Picoides borealis*; hereinafter "RCW") – a rather small (20-23 cm, 50-55 g) black-and-white woodpecker with longish bill, above black barred white, below white with black spots on flanks with black crown, nape and moustachial stripe border white cheeks and side of neck. Male has small red mark on the side of nape. A rare bird, the RCW lives only in mature pine forests in the American southeast. Like most woodpeckers, it pecks on wood, but its tastes are somewhat more specific than most varieties. It seeks out only living pines with red heart disease, a fungus that affects the tree's heartwood, in which it excavates nesting holes, drilling smaller holes to drain pitch. Groups usually breed in loose colonies in stands of tall pines, reusing their nests from year to year. There are eight clusters located in the four RCAs located in the Alpha-20 Impact Area. Currently, Fort Benning wildlife managers do not go into these areas, monitoring of the RCW cavity trees having been stopped after identification of the existence of these RCAs. These eight clusters are addressed in the Installation

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RCW Endangered Species Management Component (ESMC), which is an appendix to the Fort Benning Integrated Natural Resources Management Plan (INRMP). This document was approved on 20 November 2014 by U.S. Fish and Wildlife Service (USFWS), but has not been signed yet.

b. A few of Fort Benning's RCA locations contain cultural resources. There are six archeological sites within the Cactus-Whitson RCA and five archeological sites within the Molnar (Z-4 [LAE Field] range) RCA. The remaining RCAs are located within the K-15 or K-20 Dud Areas. No cultural resources surveys have been conducted within these dud areas for safety reasons. Of the 11 archeological sites within either the Cactus-Whitson RCA or the Molnar-Z04 RCA, only Site 9Ce1995 is considered to be potentially eligible for the National Register of Historic Places (NRHP). The remaining 10 archeological sites have been determined not eligible for the NRHP. Eligibility to the NRHP is based on criteria issued by the Secretary of the Interior. No historic buildings (or any buildings at all) are within the RCAs. Cultural resource surveys are conducted generally by observing and recording above ground remains as may be found during systematic examination of a section of land as identified within a Delivery Order under an "Indefinite Delivery, Indefinite Quantity" contract vehicle. The Phase 1 or Discovery Phase survey is conducted by archeologically trained crews looking for artifacts or ruins on the surface of the survey area and/or the placement of shovel tests 30cm wide to approximately 50-100cm in depth, every 30 meters, and sifting the contents through ¼ inch hardware cloth to reveal any artifacts or other archeological remains. A given survey may determine that a site is eligible, potentially eligible, or not eligible for the NRHP. Only Site 9Ce1995 was found potentially eligible and requires further testing or Phase 2 evaluation for its eligibility for the NRHP. For safety reasons, Phase 2 evaluation has not been done. Fort Benning manages its cultural resources by following its Integrated Cultural Resources Management Plan (ICRMP), currently under revision. This revision is anticipated to clarify existing text, but not add substantive requirements.

c. There are several tributaries leading to state waters in or near the RCA areas, which present a potential pathway for DU migration by water. For example, the RCAs in the "K Areas" may have a connection to Little Pine Knot Creek. For those in the Malone complex, they will be discharging through several tributaries to the Upatoi Creek. The Georgia Environmental Protection Department has identified sediment concerns, but no issues regarding contaminants (including DU) in any of these streams. For the RCA site in the Alabama area, the main receiving stream will be the Chattahoochee River. The Alabama Department of Environmental Management (ADEM) has identified no contaminant issues for the Chattahoochee; it is anticipated that DU migration would not present an issue either. The average annual rainfall for Fort Benning is approximately 50 inches. As discussed above in greater detail, Fort Benning's soils have higher organic content, higher water holding capacity, and a higher potential for erosion than other installations with DU. These environmental conditions, combined with the fact that more DU rounds were fired at Fort Benning than at any other installation covered by this permit application (9700 rounds), generally makes Fort Benning the "worst case" scenario for potential

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DU contamination and migration - which is why the Army has used Fort Benning in its bounding calculations. In spite of these facts, as described in more detail above, actual testing at Fort Benning has failed to find any migration of DU off the installation. As noted above, based upon analyses of soil, surface and ground water, sediment, and benthic macroinvertebrate sampling at Fort Benning, the Army has concluded that there is a minimal risk of migration of DU out of the operational range areas. The A-06 site is the closest RCA to residential areas (Kelly Hill), which is 2.5 kilometers (1.55 miles) away. All RCAs drain away from human habitation. Some RCAs are in the SDZs for HE, and the firing of HE have been restricted in these cases pending completion of this license process. Specifically, the firing of anti-tank TOW-2 and Javelin missiles is prohibited at Fort Benning due to the locations of the RCAs, a restriction that has a substantial adverse effect on the quality of Soldier training at Fort Benning. No cattle grazing occurs on or near the RCA areas. There is no reason for range personnel at Fort Benning to enter the RCAs.

(2) Fort Gordon:

a. Fort Gordon has one resident federally endangered species, the RCW. No RCW cavity trees or forage habitat occur within or near the RCA. One federal candidate species and Army Species at Risk, the Gopher Tortoise, does occur within the RCA. Both species are managed under Fort Gordon's INRMP, January 2015, and a Biological Opinion prepared by USFWS dated 2008. Formal Endangered Species Act (ESA) Section 7 consultation with the USFWS to update the Biological Opinion is currently in process. Gopher tortoise habitat is managed in the RCA by use of prescribed fire, set from the edges of the larger artillery impact area boundary. As a result, DU within the RCA may be impacted by this prescribed fire. There are some studies that suggest that DU may aerosolize or create dust when exposed to fire, potentially creating an inhalation hazard and facilitating migration of DU by air [see, e.g., Fetter, Steve and von Hippel, Frank, *The Hazard Posed by Depleted Uranium Munitions*, Science & Global Security, Volume 8:2, pp. 125-161 (1999)]; however, as noted above, air sampling in Hawaii has failed to detect DU during controlled range burns. Fort Gordon personnel are protected from potential DU inhalation by avoidance of the smoke resulting from prescribed fire. It is not anticipated that aerosolized DU or DU dust resulting from prescribed fire would have a tendency to travel off the larger artillery impact area boundary. Personnel do not enter the RCA to manage gopher tortoise.

b. Fort Gordon is not aware of cultural resources in its RCA. There are no historic structures in the RCA. Fort Gordon has not surveyed extensively for archeological resources because the RCA is located in a duded impact area. In general, Fort Gordon has identified 164 archeological sites that are eligible for listing in the NRHP, and 44 private family cemeteries that occur throughout the installation, which it manages with an ICRMP, January 2011, and a Programmatic Agreement with the State Historic Preservation Officer (SHPO) dated July 2013. There is currently one historic building, Woodworth Library, located approximately 17.7 kilometers (11 miles) away from the RCA, and no historic structures

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on the installation. There is a historic cemetery located approximately 616 meters (2020 feet) from the RCA, and an eligible archeological site approximately 302 meters (990 feet) away from the RCA. None of these historic resources are affected by the RCA, and the RCA does not impede any cultural resources management on Fort Gordon.

c. Soldiers and civilian employees who use/manage the ranges and training areas are prevented from entering the RCA unless specifically authorized for a limited purpose and time. No grazing or agriculture outleashes occur in Fort Gordon's RCA, nor is hunting allowed within the RCA boundary. Boggy Gut stream occurs near the eastern boundary of the RCA and flows to the south off the installation into Claussen Pond. Boggy Gut stream has the potential to transport DU. Fort Gordon has an average annual rainfall of 44 inches per year. A 2008 Operational Range Assessment conducted by the U.S. Army's Center for Health Promotion and Preventive Medicine (USACHPPM), now known as U.S. Army Public Health Command, determined that MCOC in surface and ground water systems were unlikely to pose an unacceptable risk to off-range receptors, although the study did not sample for DU. Cadmium, lead, and copper were all found in the surface water and bed sediment of Boggy Gut Creek. None of these metals exceeded the state water quality standards. The benthic macrovertebrate survey showed no effect. Over-all aquatic health was the same or improved downstream of the DU and range sampling areas. On the basis of the sampling data collected during this study, groundwater downgradient of the range complex does not currently contain MCOC that pose an unacceptable risk to off-range receptors. Groundwater in the Boggy Gut Creek drainage basin had slightly elevated lead levels. The concentration was below the action level for lead, but above the lower limit of uncertainty. The two deeper wells had lower levels of lead. While some MCOC may be present, it appears to be restricted to a relatively narrow cross section near the top of the aquifer. No immediate action is required, but the site should be resampled when the Fort Gordon range complex is reviewed in five years. All other metals concentrations were below their respective regulatory guidelines. The overall finding of the Operational Range Assessment Program was that Fort Gordon active ranges were assigned to the category of "unlikely that MCOC would migrate off the installation." Soils are dominantly sandy and very acidic, having been derived from marine sands, loams, and clay. The surface and subsurface soil drainage is high. Thus, most on- and off-range soils surrounding Fort Gordon are generally categorized as having a low potential for contaminant attenuation (USACHPPM 2006). The closest residential human habitation is approximately 2.25 kilometers (1.4 miles) away from the RCA. Fort Gordon does not fire HE ammunition into the RCA. In general, Fort Gordon does not have any other unique environmental condition that makes DU transport more likely than at other locations.

(3) Fort Campbell

a. Fort Campbell has two endangered species (Indiana and gray bats) and one threatened species (northern long-eared bat) that have been recorded foraging along the waterways throughout

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Fort Campbell. Although data on actual presence within the RCA is lacking due to access issues (personnel do not enter the RCA due to unexploded ordnance), the Army would expect to find all three species foraging along the waterway that bisects the site. Flying insects and moths are their primary food source. The open grasslands also support two former species at risk (Bachman and Henslow's sparrows) within the impact area. Nesting and brooding habitat exists within the RCA footprint and it is assumed the two birds occupy available habitat within the footprint. These species feed on insects and occasionally will consume plant seeds.

b. Fort Campbell staff is not aware of cultural resources within the RCA. There are no historic structures within the RCA. Fort Campbell has not surveyed extensively for archeological resources because the RCA is located in an impact area. Generally, Fort Campbell has small, diffuse, prehistoric archaeological sites and a large number of late 19th century home archaeological sites. The majority of the archaeological sites on Fort Campbell are heavily eroded and/or destroyed due to farming or military activities. Very few archaeological sites on Fort Campbell contain any historic significance or research potential. Fort Campbell manages its cultural resources with an ICRMP (2012), and a Programmatic Agreement with the both the Kentucky and Tennessee SHPOs (2009).

c. There is a small, intermittent stream (Noah's Spring Branch) that occasionally flows through the RCA, which has potential to transport DU. Highly erodible soils are found throughout the RCA which makes DU transport likely under heavy precipitation events and windy conditions. The 15-year average rainfall for Fort Campbell is more than 42 inches per year. The average wind speed is 7 mph, primarily from the south/southwest. Soldiers and civilian employees who use and manage the ranges and training areas are prohibited from entering the RCA due to numerous pieces of ordnance. The RCA area is off-limits to human occupation and entry into the impact area is strictly controlled by the Training Division. The closest residential human habitation is 3.37 kilometers (2.1 miles) away from the RCA. Fort Campbell has not fired HE ammunition into the RCA since its establishment. The HE restrictions on the RCA severely restrict mortar and artillery indirect firing exercises. Currently, the RCA is not in the SDZ for HE ammunition.

(4) Fort Knox

a. Fort Knox has two endangered species (Indiana bat and gray bat) and one threatened species (northern long-eared bat) that have the potential to occur within the RCAs. The Heins RCA lies within known Indiana and northern long-eared bat maternity and swarming habitat and the Yano RCA lies within potential Indiana and northern long-eared bat summer habitat. Both of these areas are in impact/dudged areas and no threatened or endangered bat management occurs in these areas.

b. Fort Knox staff have identified over 1,200 archaeological sites. One property, the Louisville and Nashville Turnpike/Bridges to the Past, is listed on the NRHP. The NRHP-eligible Fort Knox

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Cantonment Historic District contains 182 contributing structures and four additional buildings potentially eligible for the NRHP. These cultural resources are managed in accordance with the Fort Knox's ICRMP and a Programmatic Agreement with the Kentucky SHPO. No known cultural resources are located within the Fort Knox RCAs. Neither area has been extensively surveyed for archaeological resources because both RCAs are located in impact areas.

c. Fort Knox soil is characterized as a silty clay loam, with a relatively low potential to transport DU. The Salt River and Rolling Fork River flow near the RCAs, but not through them; accordingly, they represent a relatively low potential to transport DU. Fort Knox receives approximately 43.3 inches of rain a year. Fort Knox does not fire HE into or near the RCAs, and the RCAs are not in the SDZ for HE fire. As the establishment of the RCAs has prevented the continued use of some portions of adjacent ranges (for example, the RCA near the Heins area has resulted in the loss of three machinegun qualification targets), no personnel have a need to enter the RCAs for range maintenance. No cattle grazing occurs on or near the Fort Knox RCAs. The closest human habitation to an RCA (the Yano area, formerly known as Orbs Knob impact area) is 1.5 kilometers (0.93 miles) away from the RCA. The latest Operational Range Assessment Program (ORAP) study included testing for DU, with an assessment of the areas downstream of the RCAs. No DU was found at any of the test sites.

(5) Fort Carson

a. Fort Carson has no threatened or endangered species within or near the confirmed RCA at Range 141, nor within the potential Battalion Field Training Area (BFTA) RCA. Fort Carson's INRMP is the installation's primary guidance document for species management. In addition to the RCAs at Range 141 and the BFTA RCA, a third potential RCA was identified through an archive search in a location near Titus Road; after careful review of the Army's records, it appears that only two DU rounds were fired at this location, an amount that would not require a license to possess. Accordingly, the Army has proposed in its license submission that the Titus Road location be removed from this process, and it is not discussed further in this submission.

b. There are no protected resources or areas to be surveyed within any of the depicted RCAs. Fort Carson has not extensively surveyed the RCA at Range 141 for archeological resources because it is located in an impact area. In general, Fort Carson has historic properties identified in the following categories: districts, buildings, structures, and historic, prehistoric, and multi-component archaeological sites, which it manages with an ICRMP [2002], and Programmatic Agreements with the SHPO (2013 and 2014).

c. The drainage through the Range 141 RCA is primarily through Sand Canyon and an unnamed creek; all other pathways are through intermittent streams. Both of these locations have the potential to transport DU. In addition, Fort Carson has soils that are moderate to severe in terms of erodibility

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and are well drained, which could cause mobilization of DU into surface water and or sediment. Under the ORAP Phase II assessment, soil, groundwater, and surface water samples were taken from the areas of concern. Results showed that although some uranium was detected, isotopic activity ratios indicate that the detected isotopes originated from naturally occurring sources (activity ratio ~1) and are not attributable to DU containing munitions potentially used within these areas. Mean precipitation is approximately 17 inches per year. Rainfall ranges from approximately 12 inches (southern Fort Carson) to 15 inches (northern Fort Carson) per year. No cattle grazing occurs in any of the Fort Carson RCAs. Soldiers and civilian employees who use/manage the ranges and training areas are prevented from entering the Range 141 RCA unless specifically authorized for a limited purpose and time. Hunting is not allowed. The closest residential human habitation (Combat Aviation Brigade Barracks) is approximately 4.82 kilometers (3 miles) away from the Range 141 RCA. The closest residential human habitation is approximately 1.5 miles away from the potential BFTA RCA. Fort Carson does not fire HE ammunition into, or near, any of the RCAs. The RCA is not in the SDZ for HE ammunition. Three personnel enter the Range 141 RCA once per year to do target maintenance for about four hours.

(6) Fort Hood

a. Fort Hood has no threatened or endangered species, nor any other species of concern, within or near the confirmed RCA. Fort Hood's natural resources are generally managed through its INRMP, which was updated in 2013.

b. Fort Hood is not aware of cultural resources within its confirmed RCA. Fort Hood's cultural resources are managed through its ICRMP, last updated in June 2010.

c. The confirmed RCA is within the sub-watershed of Oak Branch, a sub-tributary of Cowhouse Creek. BtC2-Topsey clay loam, 3 to 8 percent slopes, severely eroded, appears to be the dominant Soil Map Unit within the RCA. The average annual rainfall for Fort Hood is about 32 inches. The closest residential human habitation is 5.5 kilometers (3.4 miles) away from the RCA. The Fort Hood range that includes the RCA is currently shut down with no maintenance activities or range operations occurring. The RCA is in the range live fire area and abuts the duded area. It is within the SDZ of HE ammunition from the adjacent range. Fort Hood permits cattle grazing in the RCA area. The total rounds fired at the Fort Hood RCA (about 4,000 rounds) was, conservatively, approximately half of that fired at Fort Benning, so the anticipated dose for a resident farmer at Fort Hood would be about half that of the Fort Benning resident farmer scenario. For the resident farmer living on Fort Hood's RCA, the anticipated total annual dose from all pathways (air, soil, water, ingestion of plants, meat, and milk, ect.) is approximately 0.15 millirem. Under the resident farmer scenario, only about 5.3 percent (0.008 millirem) is attributable to consumption of meat and milk from livestock that grazed in the RCA. Americans receive a total dose of approximately 620 millirem each year from various natural and man-

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made sources; according to the NRC, this dose has not been shown to cause humans any harm (see: <http://www.nrc.gov/about-nrc/radiation/around-us/doses-daily-lives.html>). The maximum anticipated dose to humans resulting from cattle grazing at Fort Hood, even assuming an individual ate and drank all of his or her meat and milk from livestock grazing in the Fort Hood RCA, would constitute a tiny fraction of the total annual dose of radiation for the average American, and would not add substantially to that total dose. The potential for health impacts to livestock, or the even more attenuated anticipated impacts to humans from consumption of the meat or milk of cattle that grazed at or near the Fort Hood RCA, are anticipated to be miniscule in light of the bounding calculations for the resident farmer scenario. This would be true even for sensitive populations of individuals consuming meat or milk from these cattle (such as infants, pregnant or nursing mothers, and/or the elderly). In short, the Army anticipates the potential impacts to human health from cattle grazing in the RCA at Fort Hood to be negligible. [See: Cherry, Robert, *Bounding Calculations Using RESRAD 7.0*, 1 June 2015.]

(7) Joint Base Lewis-McChord (JBLM)/Yakima Training Center (YTC)

a. Three federally listed species (Taylor's checkerspot butterfly, Mazama pocket gopher, and streaked horned lark) occur in the Artillery Impact Area (AIA). The extent of occupancy into the three RCAs is unknown due to the restricted access associated with these sites. The three listed species have been detected on the fringes of the RCAs, and therefore it is likely that one or more are in the RCAs. The species are currently managed across the installation via Endangered Species Management Plans that are part of the INRMP. The INRMP has been completed and was sent to the USFWS for its review and concurrence in March 2013. USFWS is still in the process of completing that review. Additionally, a Biological Assessment was completed and submitted to the USFWS in spring 2014. The USFWS is expected to issue a Biological Opinion sometime this year, which will become the defining regulatory guidance document for the management of these species. Due to the safety risk associated with the impact area, no direct management of the species occurs within the RCAs.

b. JBLM/YTC staff cannot actively manage cultural resources on the installation's three RCAs due to the safety risks associated with unexploded ordnance, but has some information about cultural resources on and near the RCAs. One RCA consists of pasture land and is believed to have a well located within it. Another RCA contains the Jamel homestead located near the end of a lake, with a Nisqually ethnographic village located near or at the same location. A third RCA contains the William Pagel homestead in its center. These RCAs contain likely and known cultural resources based on historical maps and ethnographic accounts; however, due to safety considerations, no on-the-ground surveys have been completed to verify this information. Due to the safety risk associated with the impact area, no direct management of these suspected cultural resources occurs within the RCAs.

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c. JBLM currently does not permit HE fire into the RCAs, resulting in severe training restrictions, and a complete inability to use JBLM's anti-armor training ranges. On very rare occasions in the past, personnel have entered the RCA for range maintenance, but entry to the RCAs is no longer permitted. JBLM/YTC staff are not aware of water flowing through the RCAs, or of any other obvious pathways for DU migration; although, no testing has been done. Distance to the nearest human habitation is approximately 2.81 kilometers (1.75 miles). No cattle grazing occurs on or near the RCAs. JBLM is aware of no evidence to suggest any DU migration from the area.

(8) Fort Bragg

a. Fort Bragg has endangered RCW within and near the Coleman Impact Area RCA (CIA-RCA). The SDZ for the nearest range impacts eight RCW clusters (0091, 0092, 0156, 0157, 0224, 0225, 0512, 0539) and six old-growth Longleaf pines, two of which are catfaces, historically and culturally significant trees. The RCA also contains one Endangered plant species *Schwalbea americana*, four Federal Species of Concern: *Pyxidanthra brevifolia*, *Dionaea muscipula*, *Xyris scabrifolia* and *Xyris chapmanii* and one species considered rare but has no listing status: *Tofieldia glabra*. The RCA also borders several other rare plant sites; *Lysimachia asperulifolia*, *Phynchospora oligantha*, and *Parnassia caroliniana*. RCWs are managed according to the USFWS 2003 Red-cockaded Woodpecker Recovery Plan (second revision) and the Fort Bragg INRMP. Endangered plants, Longleaf Pine ecosystem, and old-growth pines are managed according to the INRMP.

b. Fort Bragg is not aware of any NRHP-listed, or NRHP-eligible, historic properties inside the CIA-RCA. The Fort Bragg ICRMP has not documented any historic buildings, structures or archaeological resources within the known limits of the installation's CIA-RCA. Since the CIA-RCA is in the SDZ for an active ordnance impact area, and well beyond the approximate limits of the impact area's perimeter "buffer zone," Fort Bragg cannot systematically inventory this particular RCA site for cultural resources. For safety reasons, Fort Bragg does not collect cultural resources inventories in installation range areas with the potential for unexploded ordnance.

c. The SDZ for the nearest range contains wetlands, creeks, and streams. Some of this area also falls within the flood event zones. The average annual rainfall is approximately 47 inches. Wetlands are managed according to the Fort Bragg INRMP and the CWA 404/401 regulatory process. In general, this area drains to Patterson Branch and based on aerial photos there is evident soil erosion in the RCA; accordingly, there is a potential for migration of DU through water and soil. Since the CIA-RCA is within the SDZ of an active ordnance impact area; Fort Bragg cannot systematically inventory this particular RCA site for surface water, ground water, intermittent streams, and soil/air/wind erosion. The estimated closest human habitation is 5.2 kilometers (3.25 miles) south of the southern RCA boundary. Range control established one RCA based on the most credible location where spotting rounds may have

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landed. The RCA's location is within an extremely hazardous area, making it inaccessible to personnel or vehicles. The area is completely saturated with unexploded munitions. No cattle grazing occurs on or near the RCA, and no personnel enter the RCA for any reason.

(9) Fort Polk

a. Fort Polk manages natural resources under its INRMP (March 2014). Endangered species are addressed under the ESMC, a component of the INRMP. Fort Polk is home to one endangered species, the RCW, and one candidate species, the Louisiana Pine Snake. Fort Polk's RCAs are located within the "off limits" Redleg Impact Area; for safety reasons, the installation is not required by the USFWS to manage any RCW or Louisiana Pine Snakes inhabiting that portion of the post.

b. There are no known prehistoric or historic structures in any of the RCAs at Fort Polk. Because Fort Polk's RCAs are located within "off limits" impact areas, no field surveys for surface or buried cultural resource sites have ever been conducted. Fort Polk's ICRMP (August 2012) calls for field surveys and site evaluations to be completed wherever possible to support the training mission. There are a total of 163 potentially NRHP-eligible sites on Fort Polk.

c. The primary impact DU has on training is restricting HE munitions firing into two areas of Redleg Impact Area (a duded impact area). There are no other DU related impacts to training. From a management perspective, the suspected presence of DU in the two one-kilometer square boxes limits Fort Polk's range development capability. The DU areas are prime areas to emplace target arrays that would enhance Indirect Fire and Close Air Support training. Currently there are no target arrays within the suspected DU locations and therefore no reason for range personnel to enter that portion of the duded impact area. The nearest human habitation to an RCA is estimated to be 7 kilometers (4.34 miles). No cattle grazing occurs on or near the RCAs. Average annual rainfall for Fort Polk is approximately 58 inches. According to the results of the Operational Range Assessment Program report for Fort Polk, which included results of Phase II sampling and data analysis for surface water, sediment, and ground water, it is unlikely that metals, including DU, would migrate away from the operational ranges.

(10) Fort Sill

a. Fort Sill's RCA is located within West Range Impact Area. This area has not been surveyed for the presence of black-capped vireo (Fort Sill's only documented endangered species). The surrounding surveyed area does not contain known vireo nesting sites. In general, Fort Sill manages all species through its INRMP, prepared in 2014.

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b. Fort Sill's RCA is located within West Range Impact Area. For safety reasons, this area has not been surveyed for cultural resources, and Fort Sill is unaware of cultural resources within the RCA. In general, Fort Sill manages cultural resources in accordance with its ICRMP, prepared in 2014.

c. The most probable exposure pathway is through surface water and channels draining into an intermittent stream. Water flows through this stream into East Wolf Creek watershed during (and for a short time after) rain events, with pools remaining for most of the year. Average annual rainfall at Fort Sill is approximately 39 inches. In 2014, stream sediment samples at the installation boundary and directly downstream of the RCA showed no detection of uranium above background levels. Groundwater in the area is insufficient to be a potential pathway. Wind erosion is also unlikely due to vegetation and distance. Fort Sill does not permit HE fire into its RCA. This area is off-limits to personnel. The RCA is approximately 2.5 kilometers (1.6 miles) to the nearest housing area. No cattle grazing occurs on or near the RCA at Fort Sill.

(11) Fort Jackson

a. Fort Jackson's potential RCA affects two endangered RCW clusters and associated habitat. The RCA contains approximately four of the seven RCW cavity trees associated with cluster 12B-A. The RCA also contains approximately 198 acres of RCW foraging habitat associated with cluster 12B-A, and another RCW cluster (12C-A). The RCA is part of the INRMP's RCW habitat management unit referred to as the Limited Management Area (LMA). Incidental take for all RCW clusters located within Fort Jackson's LMA was provided in a USFWS Biological Opinion dated 20 November 2013. Required monitoring of RCWs has not yet been affected by the RCA, due to the nest tree historically located outside of the RCA boundary. Prescribed fire has not been accomplished in this RCW habitat since 2011. RCW habitat should be burned on a three to five year rotation. No other federally listed threatened or endangered species are known to exist in the RCA.

b. The proposed area has been previously surveyed and contains no historic properties. The South Carolina SHPO concurs. In general, cultural resources are managed at Fort Jackson through its ICRMP.

c. There are two potential means of migration of DU via surface water. The first is from a small creek on the northeast corner of the RCA that drains into Dupre Pond. The second is a small wetland area on the southern boundary of the RCA that drains into Cobb's Pond. Average annual rainfall for Fort Jackson is approximately 48 inches. The installation does not fire HE ammunition into the RCA and the RCA is not in the surface danger zone for HE ammunition. No personnel enter the RCA for range maintenance or any other purpose. No cattle grazing occurs on or near the RCA.

(12) Fort Hunter-Liggett

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a. Within the three RCAs at Fort Hunter-Liggett there is habitat for the federally listed, endangered San Joaquin kit fox (*Vulpes macrotis mutica*). The endangered California condor (*Gymnogyps californianus*) also occur in the region, and could occur on the RCAs. Impacts to these and other federally listed species are managed via terms within a Programmatic Biological Opinion (USFWS 2010), and the Fort Hunter-Liggett INRMP, last updated in 2013.

b. The three RCAs at Fort Hunter-Liggett have been partially surveyed for cultural resources, and historic and prehistoric sites are known to occur within the RCAs. Approximately 75 percent of the area within the RCAs has been surveyed for cultural resources. Within the surveyed areas, there are 19 recorded sites. Two are historic, and 17 are prehistoric. One historic site contains standing structures. The sites are managed under the Fort Hunter-Liggett ICRMP (2003), and the *Programmatic Agreement between US Army and the California State Historic Preservation Officer Regarding Operation, Maintenance, Training, and Construction at the US Army Combat Support Training Center, Fort Hunter Liggett, California* (2010).

c. The locations within the three RCAs at Fort Hunter-Liggett contain surface water courses that could transport DU; these are intermittent streams that feed to Nacimiento River, which feeds a recreational reservoir, Lake Nacimiento. There are isolated wetlands within each RCA. The RCAs contain areas of Highly Erodible Soils as defined by the U.S. Department of Agriculture's National Resources Conservation Service (NRCS). Rainfall average exceeds 19 inches per year, with 90% of rainfall occurring between November and April. Soldiers and civilian employees who use/manage the ranges and training areas are prevented from entering the RCAs. (If personnel were permitted to enter the RCAs in the future, personnel *would* enter five or six times per year for mowing and other maintenance activities.) No cattle grazing occurs on Fort Hunter-Liggett. Hunting at Fort Hunter-Liggett includes large (deer, elk, pig) and small game, with seasons open year-round, primarily on weekends. Hunters are prohibited from entering RCAs. The closest residential human habitation is approximately 2.7 kilometers (1.7 miles) away from the nearest RCA. There is no HE firing allowed in these areas. Fort Hunter-Liggett does not allow HE firing in any of the RCAs. One of the RCAs is in the middle of the improvised explosive device (IED) defeat lane used to train personnel on IEDs. Fort Hunter-Liggett has blocked the access road to prevent units from using the area. Maintenance personnel must access the area to mow weeds and perform maintenance on the buildings. Maintenance is required at least five times throughout the year.

(13) Fort Greely

a. The Donnelly Training Area, in which the RCA is located, is managed by staff at Fort Wainwright, Alaska. Fort Greely has no threatened or endangered species within or near the potential RCA located within Training Area 516 Small Arms Range and Small Arms Impact Area. There is a wide

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variety of wildlife that occur in this area, to include bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*) and other migratory birds, including a variety of shorebirds and waterfowl. There are sport fish such as arctic grayling (*Thymallus thymallus arcticus*) that migrate up the Delta River and are caught by anglers upstream and downstream of Army lands. There are spawning chum salmon (*Oncorhynchus keta*) at the intersection of the Delta and Tanana Rivers. There are also moose (*Alces alces*) and bison (*Bison bison*) that use this area. Many of these species including bison, moose and waterfowl are harvested and eaten by local subsistence and sport hunters. Chum Salmon are harvested further downstream on the Yukon River by subsistence users and commercial fishermen, some of which are sold on the international market. Fort Wainwright manages natural resources and recreation in accordance with a 2013 INRMP.

b. Fort Wainwright staff are not aware of cultural resources in the potential RCA. There are no historic structures in the potential RCA. Fort Wainwright has not surveyed extensively for archaeological resources because the potential RCA is located in an active training range and small arms impact area. In general, Fort Wainwright and its training lands contain 636 known archaeological sites and four archaeological districts, as well as a National Historic Landmark and National Historic District, which are all managed in accordance with an ICRMP dated 2013.

c. The Delta River flows through the small arms impact area adjacent to Training Area 516, which has the potential to transport DU. There is also a high chance of water exposure to the potential RCA from intermittent streams caused by snow melt each year. Based on an extensive search of relevant documents; however, no evidence has been found of DU being expended on this site and therefore no environmental impacts related to water quality, soil, air, and wildlife are expected from this site. Fort Greely does not have any unusually erodible soils, nor any other unique environmental condition that makes DU transport more likely than at other military installations. Annual rainfall at Fort Greely is about 12 inches. Soldiers and civilian employees who use and manage the ranges and training areas are prevented from entering the potential RCA unless specifically authorized for a limited purpose and time; in general, a maximum of three range personnel enter the RCA no more than twice per year to replace targets and conduct maintenance. The utility and range maintenance contractors work in the general vicinity of the potential RCA throughout the year, as well as Army, National Guard, and Civilian Law Enforcement units. No cattle grazing occur on any Fort Wainwright lands, and hunting is not allowed within the Small Arms Impact area and Small Arms Range area of Training Area 516, which encompasses the RCA. Local agriculture utilizes water from the Jarvis and Delta waterways, and water wells in the town of Delta Junction are directly and/or indirectly fed by surface and groundwater from the Delta River. The closest residential human habitation is approximately 3.2 kilometers (2 miles) away and at a much higher elevation than the potential RCA. Fort Wainwright does not fire HE into the potential RCA.

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(14) Fort Dix

a. Fort Dix, now formally part of Joint Base McGuire/Dix/Lakehurst, contains habitat for several endangered species: the pine snake, tree frog, barred owl, and long-eared bat. Due to its status as an impact area and lack of accessibility, the RCA (called the Frankfort Arsenal Range) has not been surveyed for these species. The species are managed installation-wide in accordance with the joint base's INRMP.

b. Fort Dix ranges, including the RCA, have not been surveyed fully for cultural resources due to safety considerations. Joint base staff estimates the potential for archaeological resources within the RCA to be at a "low to medium" potential. There are three potentially historic architectural resources in the general vicinity of the RCA, but the continuing use of the RCA as an impact area has not allowed for continued study. The joint base is in the process of finalizing its draft ICRMP, by which cultural resources on the base will be managed.

c. Fort Dix contains a variety of water resources in the vicinity of the RCA, including wetlands and low, slow-flowing streams. Soils in the vicinity of the RCA are characterized as highly erodible. Fort Dix receives an annual rainfall of 46 inches. No cattle grazing occurs on the installation. Non-explosive mortars and rockets are fired and impact in the vicinity of the RCA, but no HE is fired. No personnel enter the RCA for maintenance of any kind. The closest residential human habitat on post are houses to the south of Range Road, approximately 3.2 kilometers (2 miles) from the RCA. The closest residences off post are to the north of the RCA, also approximately 3.2 kilometers away.

(15) Fort Riley

a. Fort Riley has one federally listed species, the Topeka Shiner that exists within or near the potential RCAs at Ranges 27A, 27B, and 29. Sevenmile Creek, a known Topeka shiner stream is a perennial stream that flows through the RCA of Ranges 27A & 27B. Sevenmile Creek is considered a stream with a high quality of aquatic life. The Kansas Department of Health and Environment conducted testing on Sevenmile Creek and considered it an "Exceptional State Water." Fort Riley implements a Topeka Shiner management plan through the installation's INRMP that is consistent with the ESA, the Kansas Nongame and Endangered Species Conservation Act of 1975 and Army regulations. Conservation measures involve monitoring Topeka shiner populations, protecting of individual Topeka shiners, and maintaining quality Topeka shiner habitat. An important component of Fort Riley's Topeka shiner management plan is the implementation of the terms and conditions of a Biological Opinion from the USFWS regarding road construction and maintenance activities in or near streams containing Topeka shiners. These road construction and maintenance activities do not occur in the RCAs.

b. Fort Riley is not aware of cultural resources in either of its RCAs at Range 27 and Range 29. There are no historic structures in either of the RCAs. Fort Riley has not surveyed for archeological

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resources because the RCAs (and ranges) are located in the impact area. In general, Fort Riley has 889 archeological sites, which it manages with an ICRMP (2004), and a Programmatic Agreement with the SHPO (2013). In addition, the SHPO has agreed with the Army's decision not to attempt to inventory the impact area for cultural resources (via correspondence dated 20 February 1997).

c. There is a perennial stream (Sevenmile Creek) and at least one unnamed ephemeral/intermittent stream in Fort Riley's RCAs. Fort Riley receives approximately 33 inches of rain per year. Fort Riley does not permit HE fire into either of the RCAs. In fact, Fort Riley does not use the RCAs for any purpose; they are small and do not create conflicts for military training. The closest residential human habitation is at least 3.2 kilometers (2 miles) away. No cattle grazing occurs on Fort Riley.

(16) Schofield Barracks/Pohakuloa Training Area:

Schofield Barracks and Pohakuloa Training Area are located respectively on the islands of Oahu and Hawaii; therefore, the potential environmental impacts from the proposed action are different for each location. Accordingly, the information for the RCAs at these two locations are provided separately below. The Army has removed some DU from both of these locations.

Schofield Barracks

a. At Schofield Barracks there are no known threatened or endangered species within the installation RCA. In general, there are endangered species known to occur above the Schofield Barracks firebreak road which have the potential to be impacted from fires caused by military training at Schofield. The USFWS' *Biological Opinion for Routine Training and Transformation, Island of Oahu*, October 2003, addresses this fire impact. Species and other natural resources are generally managed by the INRMP for the Island of Oahu (2010).

b. At Schofield Barracks, West Range, there are 272 cultural resources contained within the RCA. There are no historic structures in the RCAs. The status of these resources under the NRHP is as follows: 44 were determined eligible; 119 were determined not eligible; and 105 remain unresolved. There are an additional four cultural resources protected as cultural items under NAGPRA. These are not formally evaluated under NHPA. The terms of the existing Programmatic Agreement (PA) for transformation of 2nd Brigade to a Stryker Brigade Combat Team require further monitoring of sites for potential damage from training and other sources. Commitments made under that PA also require improving site documentation for many sites as the opportunity arises, and survey of additional areas, particularly after prescribed burns, to improve visibility of sites and archaeological features. New construction or development of training facilities within this area would require new consultations under the NHPA to resolve any issues of potential effect to historic properties. Over 650 artifacts were collected from the RCA throughout the development of the new range from surface collection or subsurface testing. All

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artifacts were inspected with a radiological meter by certified personnel prior to removing them to the curation facility, and no radiation was found. Artifact collection from this area is anticipated to continue and will follow the same release policy under oversight of the Installation Safety Office.

c. The RCA on Schofield Barracks contains no surface or ground water resources, nor any highly erodible soils. Rainfall at Schofield Barracks is approximately 54.67 inches per year. The closest human habitation is residential housing, which is 1.23 kilometers (approximately 2 miles) away from the RCA. No cattle grazing occurs on Schofield Barracks. No HE fire occurs into or near the RCA, but the RCA is within the SDZ for HE. Up to six personnel each day (at least four days per week, but sometimes more often) must enter the RCA to conduct range maintenance. The Army intends to resume HE fire in this RCA.

Pohakuloa Training Area

a. There are no natural resources of biological significance within the four RCAs at Pohakuloa Training Area. Species and other natural resources are generally managed by the INRMP for the Island of Hawaii (2010).

b. There are features of two archeological sites located within RCA 3, and another site is located within RCA 1. The archeological site in RCA 1 is a historic lava tube temporary habitation site with illustrations of cowboys and late 19th century dates carved into the rock wall. The sites in RCA 3 include a pit site and features of a volcanic glass quarry site. Additional features of the latter two sites extend outside of the RCA. Pohakuloa Training Area has not surveyed extensively for archeological resources within the RCAs because they are in the Impact Area, and substantial portions of RCAs 2 and 4 extend into the ICM area. Pohakuloa Training Area manages archeological sites on a project by project basis, evaluating effects and establishing mitigation measures as each new project is proposed. An ICRMP is currently in development, as is a PA to cover regular ongoing training at Pohakuloa Training Area. There are not currently any agreements that require regular monitoring of the archeological sites in the RCA.

c. The four RCAs at Pohakuloa Training Area are made up of mostly 'A'ā or pahoehoe lava flow. There is very little top soil or vegetation within these areas. There are no streams that run through the RCAs. A test well several miles away from the RCAs found a perched aquifer at a depth of approximately 500 feet. There is very little potential for migration of DU to ground water. Pohakuloa Training Area does not have any unusually erodible soils, or any other unique environmental condition that makes DU transport more likely than at other locations. Average wind speed for the RCA areas are 18-20 mph, rainfall is under 20 inches per year. Soldiers and civilian employees who use/manage the ranges and training areas are prevented from entering the RCAs unless specifically authorized for a limited purpose and time. On the average, four personnel access RCA 3 four times a month for range/target maintenance. No cattle grazing occurs in any of the RCAs, although there are occasional ungulate

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sheep, goats, and feral pigs that traverse through the RCAs. Due to the minimal vegetation and live fire into the RCAs, the number of animals in the RCA areas is very low. Hunting is not allowed in the RCAs because all four RCAs are located within the Impact Area. The closest residential human habitations are: Mauna Kea Park, approximately 4.02 kilometers (2.5 miles) away from RCA 3 & 4; Kilohana Girl Scout Camp, approximately 7.24 kilometers (4.5 miles) away from RCA 1 & 2, and Waiki'i Ranch residential area, approximately 18.5 kilometers (11.5 miles) from RCA 1 & 2. Pohakuloa Training Area fired HE into all four RCA areas prior to the discovery of DU in 2006. HE ammunition is fired adjacent to the RCAs, but the RCAs are not in the SDZ for HE munitions. The restriction on HE fire on ranges affected by the RCAs (Range 10, 11T, 13, 20 and the BAX) has limited commanders' ability to prepare their Soldiers effectively for combat. Current expansion of training ranges into the impact area has reduced the overall area where HE can be fired at Pohakuloa Training Area. There are no groundwater or surface water resources within the RCAs. There is potential for DU contamination of soil near the RCAs, but the location of the RCAs on operational ranges makes testing impossible.

In general, after careful review of all of the above general and site-specific information regarding the potential impacts of the proposed action on natural and cultural resources, the Army anticipates no significant impacts to either natural or cultural resources at any of the locations. The anticipated impacts to the environment and human health from the Army's possession of DU at these locations are generally consistent with the SOCs for the CATX for possession of DU military munitions at 10 CFR 51.22(c)(14)(xv), which includes the following statements in pertinent part: "[a]ny materials released to the environment are of low radioactive content, are highly dispersed, and are of chemical and physical form which is not readily incorporated into flora or fauna. Thus, radioactive releases to the environment which could affect human health, animal, or plant life ... are negligible and occupational exposures from handling DU are so low that personnel monitoring is not required." In particular, the Army finds that there would be no impact to threatened and endangered species or cultural resources from the proposed licensing action; these resources would continue to be managed by the installations under the approved (or, in some cases, draft) natural and cultural resources management plans, as well as the various agreements between the respective installations, the USFWS, and the respective SHPOs, and natural resources divisions for each state that are referenced above. Therefore, neither consultation under Section 7 of the Endangered Species Act nor consultation under Section 106 of the National Historic Preservation Act would be required. Accordingly, the Army finds that there would be no significant impact to any aspect of the natural environment as a result of the proposed action.

C. Is the action likely to significantly affect any aspect of the cultural environment including those that might be related to environmental justice?

Army response: No, as discussed above in more detail, the Army does not anticipate any significant impact to the cultural environment, including any impact to aspects related to environmental justice.

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The action being undertaken by the staff is to authorize the possession of the DU. It does not include using the DU for any purpose, and neither will it authorize the decommissioning of the ranges in which the DU has been deposited without further NRC authorization (removal of incidentally identified fragments will be allowed). Authorizing possession (by the issuance of the license) will not change or affect the current cultural environment because the DU is already present and was deposited in the environment almost five decades ago. Thus, the proposed action will have no effect on the cultural environment. Additionally, because no effects to the environment are expected from the granting of a license to the Army for DU possession, there are no disproportionately high and adverse impacts to minority or low-income populations.

D. Is the action likely to generate a great deal of public interest about any environmental issue?

Army response: There was public interest in the DU at the Schofield Barracks and Pohakuloa Training Area, based on the public's concern about the human health effects of the DU. During the NRC's 24 March 2015 public meeting, several members of the public attended telephonically and made comments, most related to issues in Hawaii. It is possible that there could be public interest at the other locations. As discussed in the SOC's, migration of DU in the environment is expected to be minimal; the Army will be required to demonstrate that DU migration in the environment is not occurring. The Army has provided adequate information to demonstrate that the DU will not migrate in the environment under normal circumstances, and airborne migration during HE firing would not occur.

E. Is there a high level of uncertainty about the action's environmental effects?

Army response: No, the Army does not believe there is a high level of uncertainty about the action's environmental effects. Authorizing the continued possession by the Army is not expected to have an effect on the cultural or physical environment. Migration of the DU in the environment is expected to be minimal. The Army has adequately demonstrated that plant uptake and airborne migration during HE firing would not occur. Consequently, there is not a high level of uncertainty about the action's environmental effects. This is underscored by the fact that the material has been in place for about 50 years and no migration or exposure has occurred.

3. For the reasons outlined above, the Army believes that the issuance of a license to possess DU in the form of spent spotting rounds for the locations listed above falls within the scope of the activities included in 10 CFR 51.22(c)(14)(xv), and respectfully requests the NRC staff to consider the information offered above when making a final determination of the applicability of that CATX.

4. The Army will coordinate with NRC in the future should we learn of any new information that would impact the conclusions set forth above.

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5. Please do not hesitate to contact us with any further questions or concerns about the sufficiency of the above information, and we sincerely thank the NRC staff for your consideration and efforts.