

**A**udit



**R**eport

DISPOSAL OF RANGE RESIDUE

Report No. D-2000-170

August 4, 2000

Office of the Inspector General  
Department of Defense

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### **Acronyms**

AEDA	Ammunition, Explosives, and Other Dangerous Articles
ASP	Ammunition Supply Point
DLA	Defense Logistics Agency
DRMO	Defense Reutilization and Marketing Office
DRMS	Defense Reutilization and Marketing Service
EOD	Explosive Ordnance Disposal
OEESCM	Operational and Environmental Executive Steering Committee for Munitions
OSD	Office of the Secretary of Defense
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
UXO	Unexploded Ordnance



INSPECTOR GENERAL  
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August 4, 2000

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION,  
TECHNOLOGY, AND LOGISTICS

SUBJECT: Audit Report on Disposal of Range Residue (Report No. D-2000-170)

We are providing this report for review and comment. The Under Secretary of Defense for Acquisition, Technology, and Logistics did not respond to the draft report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. Therefore, we request that the Under Secretary of Defense for Acquisition, Technology, and Logistics provide comments on the final report by September 5, 2000.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Tilghman A. Schraden at (703) 604-9186 (DSN 664-9186) (tschraden@dodig.osd.mil) or Mr. Thomas D. Kelly at (215) 737-3886 (DSN 444-3886) (tkelly@dodig.osd.mil). See Appendix E for the report distribution. The audit team members are listed inside the back cover.

A handwritten signature in black ink that reads "Robert J. Lieberman".

Robert J. Lieberman  
Assistant Inspector General  
for Auditing

## Office of the Inspector General, DoD

Report No. D-2000-170

(Project No. D1999LD-0013.01)

(Formerly Project No. 9LD-5018.01)

August 4, 2000

### Disposal of Range Residue

#### Executive Summary

**Introduction.** The disposal of range residue has recently been a matter of heightened interest among Congress and DoD officials. Each year, the Services expend more than 200,000 tons of munitions. Cleanup of ordnance was reviewed 6 years ago by the Inspector General, DoD. "Review of Policies and Procedures Guiding the Cleanup of Ordnance on DoD Lands," November 22, 1994, reported that expended ordnance and explosive waste cleanup requirements and guidance developed by DoD and the Military Departments were incomplete, vague, and inconsistent. In 1997, the Office of the Secretary of Defense requested the Inspector General, DoD, to evaluate the munitions disposal process after a commercial scrap worker was killed by a live anti-tank munitions shell. In response, we issued Inspector General, DoD, Report No. 97-213, "Evaluation of the Disposal of Munitions Items," September 5, 1997, which contained 25 separate recommended actions. This audit followed up on the recommended actions of our prior report by reviewing current operations at eight military installations and their servicing Defense Reutilization and Marketing Offices.

To address our recommendations in Report No. 97-213, the Under Secretary of Defense for Acquisition, Technology, and Logistics convened a review team. The team, which included personnel from various technical backgrounds, produced a draft report on June 30, 1999. The draft report contained recommendations to improve the disposal process, but did not contain standard DoD-wide guidance for managing the disposal of range residue, as recommended in our 1997 report. In early FY 2000, the Under Secretary directed a far-reaching and comprehensive review of munitions by the Operational and Environmental Executive Steering Committee for Munitions. The review will address the recommendations made in our 1997 report and in the June 30, 1999, draft report by the Under Secretary's review team.

**Objective.** The audit objective was to determine whether the Services were disposing range residue in a safe manner. Specifically, we evaluated the adequacy of the policies, procedures, and management controls associated with the disposal of range residue generated on DoD terrestrial firing ranges. This is the second report issued on this audit. The first, Inspector General, DoD, Report No. D-2000-050, "Disposal of

Munitions Items at Fort Irwin,” December 8, 1999, addressed the audit objectives at Fort Irwin in response to a congressional request. We also reviewed the management control program as it applied to the specific audit objective.

**Results.** Military installations essentially determined their own course of action for disposing of range residue. At eight military installations selected for review, the disparate range cleaning and disposal practices generally provided adequate assurance that range residue containing explosives was not sold to the public. However, at six of the eight installations, the assurance was gained from the practice of cleaning only around targets and not disposing of any residue. In addition, corrective actions had not been taken on 10 of the 25 recommendations we had made in Report No. 97-213. One of those recommendations was to issue “how to” implementing guidance for the management and disposition of material that potentially presents an explosives hazard. That guidance is not expected to be issued before the summer of 2001. Although affording the public safety from explosives, the cleaning and disposal practices of six installations have resulted in environmental conditions that could adversely impact operations. See the Finding section for details and Appendix A for a discussion of the management control program.

**Summary of Recommendations.** We recommend that the Under Secretary of Defense for Acquisition, Technology, and Logistics have the Operational and Environmental Executive Steering Committee for Munitions, during its ongoing review of munitions, address the policy and procedural weaknesses identified by this followup review and develop implementing guidance as appropriate.

**Management Comments.** We provided a draft of this report on May 11, 2000. The Under Secretary of Defense for Acquisition, Technology, and Logistics did not comment on the draft report. Therefore, we request that the Under Secretary provide comments by September 5, 2000.

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## Background

The disposal of range residue has recently been a matter of heightened interest among Congress and DoD officials. Each year, the Services expend, by firing and demilitarization, more than 200,000 tons of munitions. In general, range residue has not been removed from impact areas, unless it posed a direct safety hazard (still containing explosives), was necessary for test evaluation, or interfered with the maintenance of targets. As a result, an unknown amount of range residue, potentially containing explosives, has built up on an estimated 9 million acres of training ranges managed by DoD. The environmental consequences of such a buildup, which caused ranges to be shut down in Hawaii and Massachusetts, propelled the Services to increase and broaden their efforts to clean their ranges. Cleanup of ordnance was reviewed 6 years ago by the Inspector General, DoD. "Review of Policies and Procedures Guiding the Cleanup of Ordnance on DoD Lands," November 22, 1994, reported that expended ordnance and explosive waste cleanup requirements and guidance developed by DoD and the Military Departments were incomplete, vague, and inconsistent.

In 1997, the Office of the Secretary of Defense requested the Inspector General, DoD, to evaluate the munitions disposal process after a commercial scrap worker was killed by a live anti-tank munitions shell. The shell was purchased as purportedly inert scrap and presumably came from a Fort Irwin, California, firing range. In response to the request, we issued Inspector General, DoD, Report No. 97-213, "Evaluation of the Disposal of Munitions Items," September 5, 1997, which concluded that DoD needed to improve management controls to prevent public access to live ammunition, explosives, and other dangerous articles (AEDA). The report contained 25 separate recommended actions to improve the safe disposal of expended munitions. In a September 7, 1999, memorandum to the Under Secretary of Defense for Acquisition, Technology, and Logistics, the Deputy Inspector General expressed concern that most agreed-to actions had not been implemented and at least some of the problems we had reported in our 1997 report remained largely unresolved.

This audit followed up on recommended actions of our prior audit by reviewing current operations at eight military installations and their servicing Defense Reutilization and Marketing Offices (DRMOs).

**Definitions.** Munitions are all ammunition products, devices, and components produced or used by DoD for national defense and security. Munitions include chemical warfare agents and explosives, such as artillery ammunition, bombs,

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demolition charges, grenades, guided and ballistic missiles, and rockets. Unexploded ordnance (UXO) is defined as munitions that have been primed, fused, armed, or otherwise prepared for action; that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operation, installation, personnel, or material; and that remain unexploded by malfunction, design, or any other cause. For the purpose of this report, range residue includes expended munitions and UXO as well as used targets. Munitions are expended by DoD in the United States on military ranges during weapon system testing and troop training activities. Ranges can include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, and impact areas. All ranges have buffer zones with restricted access and exclusionary areas.

**Responsibility.** The Under Secretary of Defense for Acquisition, Technology, and Logistics is the principal staff assistant and adviser to the Secretary of Defense for all matters relating to material development; acquisition; storage; distribution; maintenance; and disposition. The following subordinates to the Under Secretary have roles in the munitions disposal process.

- The Deputy Under Secretary of Defense (Environmental Security) is responsible for advising the Under Secretary on safety issues, including preventing explosives incidents and protecting people, equipment, and facilities from the effects of accidental explosion. The DoD Explosives Safety Board, established by the Deputy Under Secretary, is responsible for ensuring that operations involving military explosives are conducted safely by maintaining DoD explosives safety standards, conducting site surveys, and evaluating site explosives safety plans. The Operational and Environmental Executive Steering Committee for Munitions (OEESCM), headed by the Deputy Under Secretary, is responsible for developing overarching DoD policies, positions, and action plans related to the life-cycle management of munitions to support readiness by balancing operational needs, explosives safety, and environmental stewardship throughout the acquisition, management, use, and disposal of munitions.
- The Deputy Under Secretary of Defense (Logistics) is responsible for advising the Under Secretary on all issues related to logistics, including material development, acquisition, storage, distribution, maintenance, and disposition.

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- The Director, Defense Procurement, advises the Under Secretary on all issues related to developing, interpreting, and publishing procurement policy.

In addition to the above staff elements, the following organizations have roles in the munitions disposal process.

- The Defense Logistics Agency (DLA) is responsible for disposing excess property that the military generates. Within DLA, the Defense Reutilization and Marketing Service (DRMS), Battle Creek, Michigan, is responsible for performing the property disposal mission through 100 DRMOs worldwide. DRMOs sell range residue for the Services.
- The U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Alabama, provides contracting and oversight services for DoD organizations involved in ordnance clearance from formerly used Defense sites and, as requested, from active ranges.

**Criteria.** DoD guidance on the sustainable use and management of active and inactive ranges located within the United States is contained in DoD Directive 4715.11, "Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges within the United States," August 17, 1999. The directive states that it is DoD policy to:

- use and manage DoD ranges in a manner that supports national security objectives and maintains the high state of operational readiness essential to the U.S. Armed Forces;
- ensure the long-term viability of DoD ranges while protecting human health and the environment;
- limit, to the extent practical, the potential for explosives mishaps and the damaging effects of such to personnel, operational capability, property, and the environment;
- resolve conflicts between explosives safety and other requirements with the objective of minimizing explosives hazards; and
- design and use DoD ranges and the munitions used on them, to the extent practical, to minimize both potential explosives hazards and harmful environmental impacts and to promote resource recovery and recycling.

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DoD guidance for disposing range residue is contained in DoD Manual 4160.21-M, "Defense Reutilization and Marketing Manual," August 1997, and DoD Manual 4160.21-M-1, "Defense Demilitarization Manual," October 1991. The DoD manuals, issued by the Office of the Deputy Under Secretary of Defense (Logistics), establish guidance on the disposal responsibilities of the Services as well as DRMS and its DRMOs. As of March 31, 2000, both DoD manuals had been updated and issued in draft form. The disposal of range residue is also subject to the Resource Conservation and Recovery Act (RCRA), as amended by the 1997 Munitions Rule. The Munitions Rule is an agreement between the Environmental Protection Agency and DoD on how munitions should be handled under RCRA.

**DoD-Directed Reviews.** To address our recommendations in Report No. 97-213, the Under Secretary of Defense for Acquisition, Technology, and Logistics convened a review team. The team, which included personnel from various technical backgrounds, produced a draft report on June 30, 1999. The draft report contained recommendations to improve the disposal process, but did not contain standard DoD-wide guidance for managing the disposal of range residue, as recommended in our 1997 report. After the Deputy Inspector General's September 1999 memorandum, the Under Secretary directed a far-reaching and comprehensive review of munitions by OEESCM. The review will address the recommendations made in our 1997 report and in the June 30, 1999, draft report by the Under Secretary's review team. OEESCM began its review of the disposal of range residue in November 1999.

## Objective

The audit objective was to determine whether the Services were disposing range residue in a safe manner. Specifically, we evaluated the adequacy of the policies, procedures, and management controls associated with the disposal of range residue generated on DoD terrestrial firing ranges. We focused on following up on the recommendations made in our 1997 report. This is the second report issued on this audit. The first, Inspector General, DoD, Report No. D-2000-050, "Disposal of Munitions Items at Fort Irwin," December 8, 1999, addressed the audit objectives at Fort Irwin in response to a congressional request. We also reviewed the management control program as it applied to the specific audit objective. See Appendix A for a discussion of the audit scope and methodology and our review of the management control program. See Appendix B for prior coverage related to the audit objective.

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## **Disposal of Range Residue**

Military installations essentially determined their own course of action for disposing range residue. Disparate disposal practices were in place at military installations because the Under Secretary of Defense for Acquisition, Technology, and Logistics had not effectively addressed the recommendations in Report No. 97-123. At eight military installations selected for review, the disparate range cleaning and disposal practices generally provided adequate assurance that range residue containing explosives was not sold to the public. However, at six of the eight installations, the assurance was gained from cleaning only around targets and not disposing of any residue--the consequence of a number of policy and procedural weaknesses stemming from a lack of clear DoD guidance. DoD regulatory guidance also does not specify a way for seeking funds to clean ranges. Corrective actions had not been taken on 10 of the 25 recommendations we had made in Report No. 97-213. One of those recommendations was to issue "how to" implementing guidance for the management and disposition of material that potentially presents an explosives hazard. That guidance is not expected to be issued before the summer of 2001. Although affording the public safety from explosives, the cleaning and disposal practices of six installations have resulted in environmental conditions that could adversely impact operations.

## **Course of Action for Disposing Range Residue**

Military installations essentially established their own course of action for disposing range residue. To determine whether the Services were disposing range residue in a safe manner, we reviewed current operations at eight military installations (two from each Service) and their servicing DRMOs. Except for two installations, collection and disposal practices were essentially guided by the need to maintain targets and by funding constraints. Details on the eight installations visited and the results of our review are summarized in Appendix C. The disparate range cleaning and disposal practices generally provided adequate assurance that range residue containing explosives was not sold to the public, although that could be attributed more to the installations not disposing of range residue than to sound disposal practices. Although range personnel expressed a desire to clean and dispose of range residue more thoroughly, they were hampered by a number of policy and procedural weaknesses stemming from a lack of clear DoD guidance. In general, the installations were unsure as to the extent they should clean ranges, the disposal methods they should employ, how they should acquire funds, how they should

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comply with environmental restrictions, how they should treat range residue, and how they should dispose of small-caliber expended cartridges in the most efficient manner.

## **Extent of Clearance**

**Current Disposal Practices.** DoD regulatory guidance does not specify the extent that range residue should be collected and disposed of. At the eight military installations, the breadth and degree of cleaning the ranges varied considerably. All eight installations collected expended cartridges at points of fire on ranges and disposed of them through DRMS or their local qualified recycling program (QRP) center. All eight installations regularly cleaned impact areas to maintain targets, but only two (Fort Irwin, California, and Nellis Air Force Base, Nevada) also regularly collected residue that had missed impact areas or did not interfere with the maintenance of targets. Fort Irwin and Nellis were also the only two installations that actually disposed of the residue. At the six other installations, the cleaning process essentially entailed local explosive ordnance disposal (EOD) personnel going down range after a firing exercise and detonating UXO. Subsequently, and as operational requirements dictated, they or contractor target maintenance personnel would collect and place large residue in a pile on the range. Thus, except for expended cartridges, range residue outside the impact area was not collected, while the range residue that was collected was never actually removed from the installation.

**Ideal Disposal Practices.** Personnel at the six installations that performed limited cleaning believed that broader and more in-depth cleaning was desirable. However, to accelerate the effort, they believed an outside impetus was needed. In recent years, both Fort Irwin and Nellis were driven to more thorough cleaning and disposal practices by safety or environmental concerns. At least from a cleaning standpoint, Nellis was also directed by higher level guidance. Air Force Instruction 13-212, volume II, "Weapons Range Management," August 26, 1994, provides details for cleaning ranges depending on their use as well as for a one-time complete clearing of all ranges every 5 years--the only definitive range-cleaning criteria published above the installation level by any of the Services or the Office of the Secretary of Defense (OSD). Range personnel at the installation level told us they would welcome a definitive requirement or quantified standards from higher command levels.

DoD Directive 4715.11 provides that range clearance operations are to permit the sustained safe use of DoD ranges for their intended purpose. While the practice of collecting and disposing only expended cartridges and relocating other residue at impact areas may seem safe and satisfy operational requirements, it does not satisfy the need to promote resource recovery and recycling in accordance with the environmental requirement of DoD Directive

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4715.11. If military installations are to meet environmental objectives as well, DoD guidance needs to be more emphatic and clearer in establishing the extent that range residue must be collected and disposed of.

## **Funding**

DoD regulatory guidance does not specify a way for seeking funds to clean ranges. Range personnel at six of the eight installations either were unsure how to seek funds to clean ranges or believed that such programming would be useless in view of existing funding constraints. Only Fort Irwin and Nellis sought and received funds, a total of \$11 million in FY 1999, to clean ranges and dispose of the residue. The six other installations either did not seek or did not receive funds. Having no funds specifically earmarked for range cleaning and residue disposal, the six other installations either performed limited cleaning or developed range cleaning initiatives with alternative funding sources.

Two installations--the Naval Air Warfare Center China Lake, California, and Eglin Air Force Base, Florida--which were mainly dependent on funding from customers for research and development testing, made use of operational funds received for environmental programs to develop range clearance initiatives. In FY 1999, China Lake spent about \$50,000 of pollution control funds to build a secure storage area for inert residue and to clean an inactive range. Range personnel at Eglin told us that they were unsure as to what cleaning and disposal techniques they should employ and had requested \$100,000 in FY 2001 for an environmental project to determine the best way to surface clean and dispose of range residue.

DoD Directive 4715.11 requires that DoD Components establish safe and practical methods for recycling or disposing range residue in accordance with DoD Manual 4160.21-M. However, the directive does not provide instructions for obtaining funds to carry out the methods.

## **Environmental Restrictions**

DoD regulatory guidance does not address how installations are to comply with restrictions imposed by the Munitions Rule. DoD Directive 4715.11 requires that the heads of each Military Component establish and implement procedures to assess the environmental impacts of munitions use on DoD ranges. The basis of concern is the RCRA, which requires the safe storage, transport, and disposal of hazardous waste. The Munitions Rule, issued by the Environmental Protection Agency in August 1997, excludes range clearing exercises from

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RCRA regulation. However, the Munitions Rule states that any debris or UXO removed from a range for treatment or disposal is a solid waste and, if a hazardous waste, could potentially be subject to RCRA regulation.

The eight installations reacted in different ways to the Munitions Rule. Several installations were unsure whether they could dispose of range residue because they had not determined whether the munitions they expended contained hazardous material. At the two installations that actually disposed of range residue, little was done to determine whether it contained hazardous material.

- At Fort Irwin, one munition was assessed, found potentially hazardous, and segregated for separate disposal.
- At Nellis, no assessments were made, no munitions were singled out as potentially hazardous, and none were segregated for separate disposal.

At the six installations that did not dispose of range residue, the effort taken to determine whether munitions contained hazardous material ranged from 33 assessments at the Marine Corps Air Ground Combat Center, Twentynine Palms, California, to none at Eglin. Eglin's position was that it would be cheaper to just declare any questionable residue hazardous and dispose of it separately than it would be to do an assessment. The cost of making assessments was generally not separately maintained; however, one assessment contracted for by Fort Polk, Louisiana, cost \$700.

OSD needs to provide installations with an efficient, coordinated, and possibly centralized approach to identifying what range residue is hazardous as well as detailed instructions on what must be done to dispose of range residue in accordance with the Munitions Rule.

## Use of Contractors

**Guidance.** DoD regulatory guidance is not clear on the use of contractors to collect and dispose of range residue. The DoD manuals do not address collecting, but do provide for disposing range residue through DRMOs, although other means are not prohibited. As a result, an assortment of collection and disposal approaches were put in place or planned at the eight installations reviewed. The approaches ranged from an entirely contractor-operated disposal process at Nellis to an entirely

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Government-operated disposal process at China Lake. For its Leach Lake range, for example, Nellis engaged a contractor that had its own EOD capability to:

- sweep and, as appropriate, detonate unexploded munitions;
- collect and render the residue safe, and establish a chain of custody; and
- dispose of the residue at a recycling contractor with smelting capability.

The Nellis approach eliminates the Government's role in selling the range residue through DRMS and the resulting potential safety problem of buyers (scrap dealers) commingling the residue with explosive ordnance scrap obtained from unknown sources. The Nellis approach of using contractors also opens the possibility for consolidating requirements on a regional basis. China Lake had made tentative plans to sweep, detonate, collect, and render residue safe in-house, and dispose of the residue through DRMS. Both approaches (contractor and in-house) would get the job done; however, there are advantages and disadvantages to each and their selection or a combination thereof would depend on the unique operational requirements of each installation.

**Awareness.** The eight military installations were not fully aware of each other's approach and the degree that contractor support could be employed. Most of the installations employed on-hand military EOD personnel to sweep target areas and employed or planned to employ DRMS to dispose of the residue. Fort Irwin used that approach, but also employed a contractor to collect residue from the ranges and render it safe. The Fort Irwin contractor was actually engaged by the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville (Huntsville Center) which provided daily Government surveillance over the contractor's performance. The collection service provided Fort Irwin was the same as that contracted by the Huntsville Center for six other installations not included in our review. Contract personnel at the Huntsville Center told us that the approach used by Nellis was preferable and would have been sought for Fort Irwin had they known contractor disposal was acceptable--their reading of the DoD manuals was that residue had to be disposed of through DRMS. OSD needs to clarify the extent to which contractors can be engaged for collecting and disposing range residue and to inform installation commanders of the various cleaning and disposal approaches taken at other installations.

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## Treatment of Residue

DoD regulatory guidance is unclear on how range residue is to be treated. Guidance for treating range residue before disposal is contained in the DoD manuals. Draft DoD Manual 4160.21-M provides the following guidance.

Range residue shall be rendered safe (neutralized, fired, vented, decontaminated, and so forth) by violent destructive methods to ensure explosives, propellants or chemicals are consumed. The methods taken should make it immediately apparent that the residue is not hazardous (for example, it will not be in its original configuration, and the area normally housing the hazardous material will be opened for visible inspection).

Although that guidance should be enough to render range residue safe, DoD Manual 4160.21-M also provides guidance for demilitarizing all range residue other than small-caliber cartridges and inert metal gleaned during cleanup, stating that destruction shall, at a minimum, satisfy the provisions of DoD Manual 4160.21-M-1. DoD Manual 4160.21-M-1 establishes demilitarization requirements for surplus military end items that can be used for their original military purpose. Range residue consists of components or parts that are likely not usable for their original military purpose because they are no longer part of an end item and are damaged. DoD Manual 4160.21-M-1 states that when components or parts are designated a key point in the demilitarization requirements of an end item, “then all surplus spare parts or components of the key point will be demilitarized in the manner prescribed for the end item.” DoD Manual 4160.21-M-1 specifically lists the key points of ammunition as the explosives and the containers that house the explosives, but also adds the phrase “other military designed features.” At the eight installations, the destructive methods employed or planned appeared sufficient to render expended munitions safe. Only Fort Irwin had specifically contracted for demilitarization services--a line item in its collection and disposal contract. Quality assurance personnel at Fort Irwin questioned the need to demilitarize the components or parts of several expended munitions on the basis that they were damaged and could not be used for their original military purpose. Figures 1 and 2 show two examples, the penetrator and sabot of the 120-millimeter (mm) projectile used in tanks.

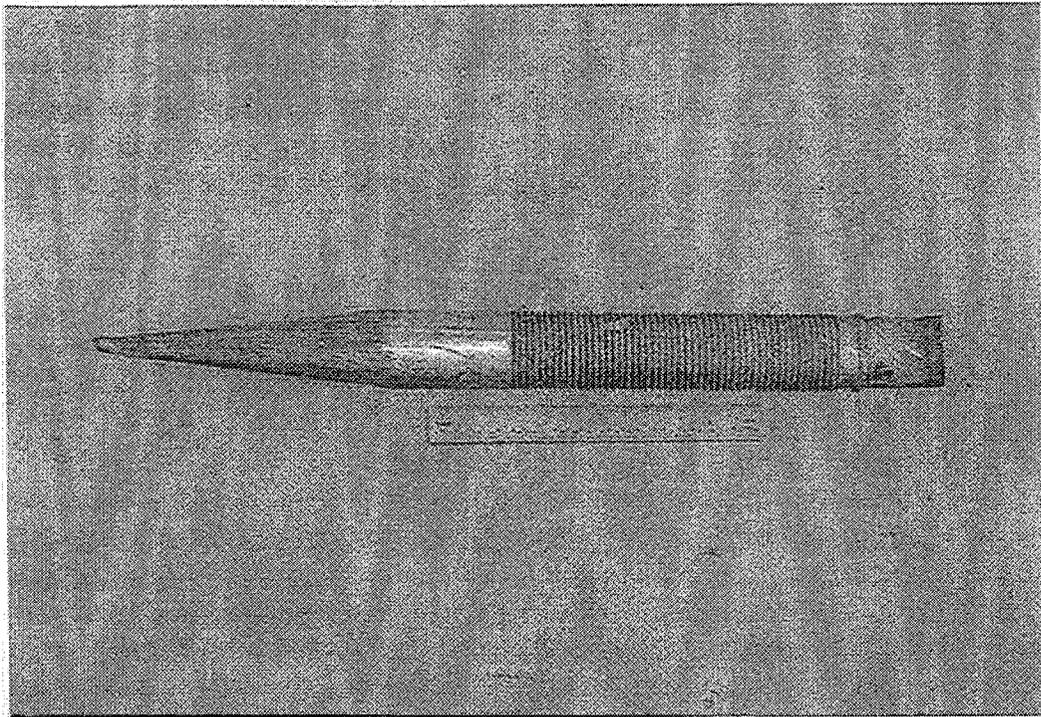


Figure 1. Penetrator, 120mm projectile

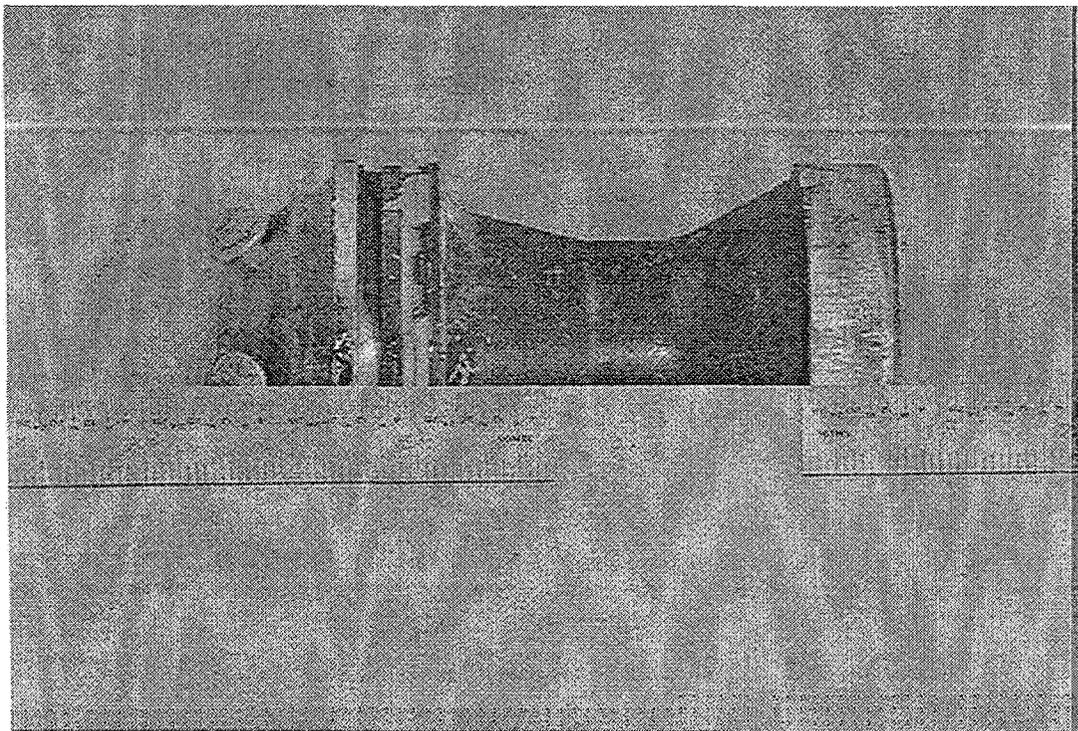


Figure 2. Sabot, 120mm projectile

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The penetrator and sabot shown in Figures 1 and 2 are both less than 2 feet in length and essentially consist of nothing more than high-grade steel (penetrator) and high-grade aluminum (sabot). In December 1997, DLA identified the penetrator and sabot as key military design features requiring total destruction by torch cutting or smelting according to DoD Manual 4160.21-M-1. However, the penetrators and sabots included in range residue are not surplus components, which DoD Manual 4160.21-M-1 is intended to govern. To comply with the DLA ruling, Fort Irwin must demilitarize thousands of damaged, unusable penetrators and sabots that have already been rendered safe. For the first 6 months of its most recent contract, October 1999 through March 2000, Fort Irwin incurred demilitarization costs of about \$190,000. With funding scarce, the necessity to demilitarize in addition to rendering items safe should be clearly established. OSD needs to distinguish between range residue that has been rendered safe and serviceable surplus items that require demilitarization.

## **Destruction of Small-Caliber Expended Cartridges**

DoD guidance on the destruction and turn-in of small-caliber expended cartridges is inefficient. DoD Manual 4160.21-M authorizes DoD Components to exercise direct sale authority for expended small-caliber cartridge cases (.50 caliber or less) through QRP centers, provided the cartridges are crushed, shredded, or otherwise destroyed prior to release from DoD control. Three of the eight installations elected to sell such residue through their QRP centers (as opposed to DRMS) and spent as much as \$15,000 on equipment the QRP centers needed to crush, shred, or otherwise destroy the cartridges. That expense could have been avoided by using DRMS, which is not required to deform the cartridges. Also, DRMS will fully reimburse installations for all the cartridges it sells. The reimbursed funds are available to the installations to use on morale, welfare, and recreation activities--the same as if the local QRP center had earned the funds. Figure 3 shows two deformed .50-caliber expended cartridges next to one undeformed .50-caliber expended cartridge.

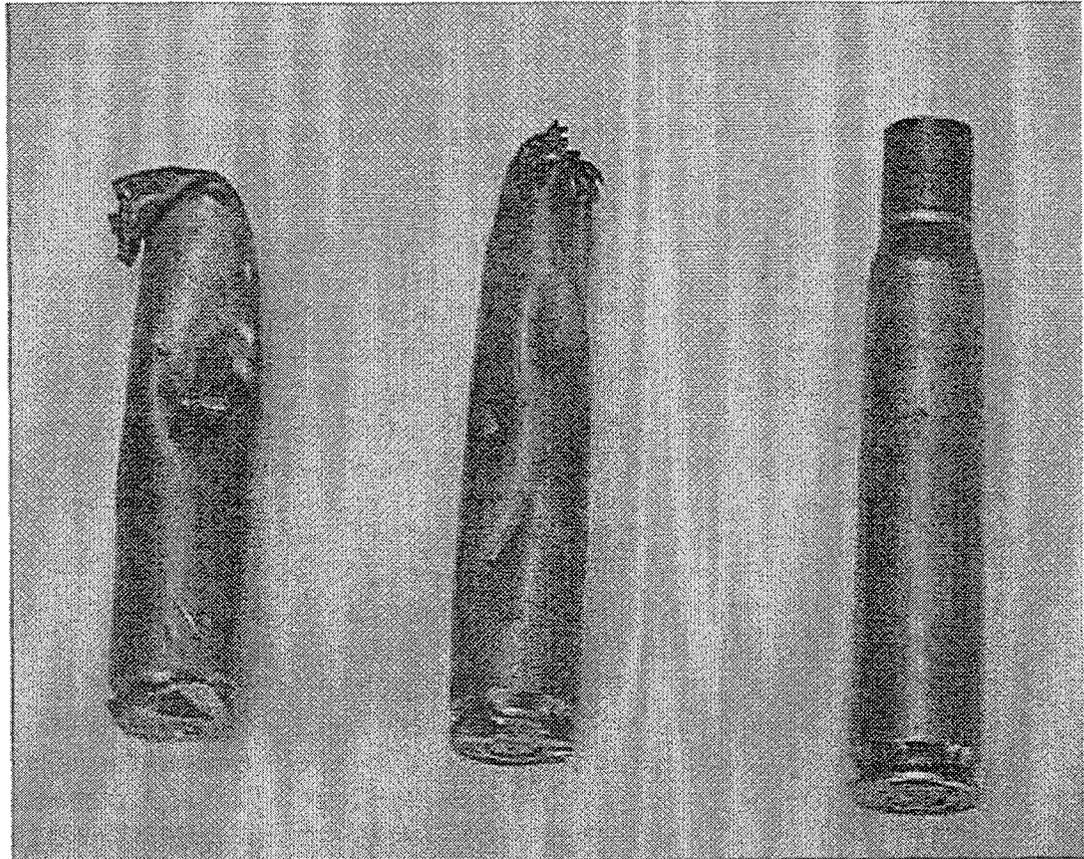


Figure 3. Expended .50-caliber cartridges

The only reason to deform the cartridges is to prevent their reuse, but the same cartridges can easily be purchased commercially. However, QRP centers have not always adhered to the small-caliber limitation in accepting expended munitions. At two of the three installations that used QRP centers, we noted that expended munitions larger than .50 caliber were accepted. OSD needs to establish an efficient, safe, and consistent process for the disposal of small-caliber expended cartridges.

## **Prior Review and Actions Taken**

OSD has yet to provide sufficient guidance to ensure that the Services collect and dispose of range residue in the safest manner. Overall, the actions taken by OSD and the Services in response to our 1997 report have been untimely and have not effectively addressed the problems identified. Our 1997 report contained 25 separate recommended actions: 15 to the Under Secretary of Defense for Acquisition, Technology, and Logistics; 3 to the Military Departments; 6 to the Commander, DRMS; and 1 to the Commander, Fort Lewis, Washington. As of January 31, 2000, we could substantiate that only 15

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recommended actions were fully complied with or were no longer viable: 7 to the Under Secretary; 1 to the Military Departments; 6 to the Commander, DRMS; and 1 to the Commander, Fort Lewis. The results of our review of actions taken on our prior report are presented in Appendix D.

The most crucial actions recommended in our prior report were to be undertaken by the Under Secretary of Defense for Acquisition, Technology, and Logistics. In response to our recommendations, the Under Secretary of Defense established a team to review the munitions residue disposal process. The review team was composed of members from the Services, DLA, and OSD. They represented the operations, logistics, test and evaluation, environmental, explosives safety, and EOD communities. The review team produced a June 30, 1999, draft report that addressed the issues we raised in 1997, but the draft report did not contain standard DoD-wide policy, procedures, and training for managing the disposal of AEDA as recommended in our 1997 report. In fact, the draft report was just a preliminary step toward implementing the agreed-to recommendations. In July 1999, the Deputy Under Secretary of Defense (Environmental Security) generated an issue paper requesting a centralized approach to gathering data on the potential human health and environmental impacts of expending munitions on ranges. The Under Secretary approved the request, which resulted in OEESCM developing a five-step approach to gathering data on keeping ranges operational. The Under Secretary endorsed the approach in December 1999 and also requested a more comprehensive look at the environmental and explosives safety concerns throughout the life cycles of munitions and ranges.

The fifth step of the OEESCM five-step approach was the development of a munitions action plan. The plan contained numerous actions to improve environmental stewardship and enhance explosives safety compliance across the complete munitions life cycle. Several of the actions dealt with use of munitions on ranges and were undertaken by a working group formed by OEESCM in November 1999. The focus of the working group is the development of a centralized DoD policy for the management and disposition of material that potentially presents an explosives hazard. The working group intends to act on the recommendations in our 1997 report as well as the review team's June 30, 1999, draft report. A two-step approach is planned. The first step will be the development of a single policy document that provides the responsibilities, policies, and procedures for laying the groundwork for more detailed guidance. The working group expects to have a draft of the single policy document ready for formal staffing in the summer of 2000. The second step will be the development of "how to" implementing guidance. The working group expects to have a draft of the implementing guidance ready for formal staffing by the summer of 2001.

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## **Environmental Effects and Conclusion**

Cleaning firing ranges and disposing the residue is a relatively new venture for most military installations. The historical approach of cleaning only around target areas and burying the residue satisfied operational requirements and was inexpensive and safe, although not environmentally safe. In fact, in recent years, two military ranges were shut down because of environmental concerns. In Massachusetts, the Environmental Protection Agency alleged that training operations at the Massachusetts Military Reservation were contaminating the drinking water supplied to Cape Cod. The training range was shut down during 1998 and 1999 while DoD investigated the allegation. In Hawaii, the Army shut down training at the Makua Military Reservation because a citizen group alleged that the Army did not conduct a comprehensive evaluation of the effects of its training. Regulator and citizen-invoked actions like those in Massachusetts and Hawaii will likely increase as authorities focus more attention on military ranges. Environmental conditions at the six installations could lead to shutdowns in operations and, in turn, a decline in the readiness of our military forces.

Our 1997 report recommended that OSD provide military installations with standard guidance covering the entire range residue disposal process. Although OSD reviewed the process, no “how to” guidance had been promulgated as of March 31, 2000. Accordingly, this report shows that military installations, still confronted with policy and procedural weaknesses, have generally continued to restrict cleaning to target areas and not dispose of residue, while environmental pressure to clean ranges more thoroughly and dispose of the residue has continued to build. However, a recent comprehensive initiative by the Under Secretary of Defense for Acquisition, Technology, and Logistics to have OEESCM review all aspects of munitions management offers promise that the recommendations in our prior report and the policy and procedural weaknesses discussed in this report will be satisfactorily addressed in the relatively near future. If they are not addressed or further delays occur, the risk to DoD operations will continue to increase.

## **Recommendations**

We recommend that the Under Secretary of Defense for Acquisition, Technology, and Logistics direct the Operational and Environmental Executive Steering Committee for Munitions, during its ongoing review of munitions, to address the policy and procedural weaknesses identified in this report and develop implementing guidance as appropriate. Updated guidance should:

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1. Establish the extent to which DoD ranges on military installations must collect and dispose of range residue in order to promote resource recovery and recycling in accordance with DoD Directive 4715.11, "Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges within the United States," August 17, 1999.

2. Establish a process for military installations to obtain funds for collecting, recycling, or disposing range residue in a safe and practical manner.

3. Establish an efficient, coordinated, and possibly centralized approach that military installations should follow to determine whether range residue contains hazardous material, and provide military installations with detailed instructions on how to dispose of range residue in accordance with the Munitions Rule.

4. Establish the extent to which military installations can engage contractors for collecting and disposing range residue, and provide a means for military installations to become aware of the various cleaning and disposal approaches taken by others and available to them.

5. Establish clear criteria for military installations to render range residue safe and also clearly distinguish between range residue that has been rendered safe and serviceable surplus items that require demilitarization.

6. Establish an efficient, safe, and uniform process for military installations to follow in disposing small-caliber expended cartridges.

## **Management Comments Required**

The Under Secretary of Defense for Acquisition, Technology, and Logistics did not comment on the draft report. We request that the Under Secretary provide comments on the final report.

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# Appendix A. Audit Process

## Scope and Methodology

We reviewed the policies, procedures, and management controls in effect at eight military installations and their servicing DRMOs for cleaning and disposing range residue during 1999. Two installations were judgmentally selected from each of the Services: from the Army, Fort Irwin and Fort Polk; from the Navy, Naval Air Warfare Center China Lake and Naval Air Station Fallon, Nevada; from the Air Force, Eglin Air Force Base and Nellis Air Force Base; and from the Marine Corps, the Marine Corps Air Ground Combat Center, Twentynine Palms, and the Marine Corps Air Station Yuma, Arizona. On-site visits and observations were made at the eight military installations and their servicing DRMOs.

Specifically, we interviewed the individuals involved in the expended munitions disposal process. We obtained related documentation, including briefing packages, correspondence, incident reports, letters of authorization, local policies and procedures, and memorandums of understanding, dated from October 1, 1998, through February 29, 2000. We toured the ranges and disposal facilities, delineated the range residue disposal process, and took or obtained photographs of operations or conditions in place. Photographs we obtained, although dated in some cases, still portrayed conditions current at the time of our review.

We selected examples of DD Forms 1348-1, "Single Line Item Release/Receipt Document," for the 12-month period before June 30, 1999, representing turn-ins to the DRMO or QRP recycling center. We evaluated the process by which the material was inspected and certified as inert and reviewed associated personnel training requirements and practices. We obtained and reviewed contract documentation, dated from October 1, 1998, through February 29, 2000; interviewed contractor personnel; and evaluated the effectiveness of contractor quality control and Government surveillance. We also collected quantitative data (weight of expended munitions); obtained incidence reports since October 1, 1998; and reviewed demilitarization requirements.

**DoD-Wide Corporate Level Government Performance and Results Act (GPRA) Coverage.** In response to the GPRA, the Secretary of Defense annually establishes DoD-wide corporate level goals, subordinate performance goals, and performance measures. This report pertains to achievement of the following goal, subordinate performance goal, and performance measure:

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**FY 2000 DoD Corporate Level Goal 2:** Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. **(00-DoD-2)**

**FY 2000 Subordinate Performance Goal 2.3:** Streamline the DoD infrastructure by redesigning the Department's support structure and pursuing business practice reforms. **(00-DoD-2.3) FY 2000**

**Performance Measure 2.3.1:** Percentage of the DoD Budget Spent on Infrastructure. **(00-DoD-2.3.1)**

**DoD Functional Area Reform Goals.** Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following functional area objectives and goals:

- **Environmental Functional Area. Objective:** Reduce, in a cost-effective manner, risks to human health and the environment attributable to contamination resulting from past DoD activities. **Goal:** Support the development and use of cost-effective innovative technologies and process improvements in the restoration process. **(ENV-1.7)**
- **Logistics Functional Area. Objective:** Streamline logistics infrastructure. **Goal:** Implement most successful business practices. **(LOG-3.1)**

**High-Risk Area.** The General Accounting Office has identified several high-risk areas in DoD. This report provides coverage of the Defense Infrastructure high-risk area.

**Use of Computer-Processed Data.** We did not use computer-processed data to perform this audit.

**Audit Type, Dates, and Standards.** We performed this program audit from June 1999 through March 2000 in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. Accordingly, we included tests of management controls considered necessary.

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**Contacts During the Audit.** We visited or contacted individuals and organizations within DoD. We also contacted various contractor personnel involved in the cleaning and disposal of range residue at military installations selected for review. Further details are available upon request.

## **Management Control Program**

DoD Directive 5010.38, "Management Control Program," August 26, 1996, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

**Scope of the Review of the Management Control Program.** We reviewed the adequacy of DoD management controls over the clearance of range residue from ranges and the disposal of residue. Specifically, we reviewed applicable policies and procedures at OSD to determine their adequacy and sufficiency. We also reviewed actual disposal practices at eight military installations to determine whether existing management controls over collection, turn-in, inspection, certification of inertness, storage, physical security, and sale of range residue were in place and functioning as intended. We reviewed management's self-evaluation applicable to those controls.

**Adequacy of Management Controls.** We identified material management control weaknesses for OSD as defined by DoD Instruction 5010.40, "Management Control (MC) Program Procedures," August 28, 1996. OSD management controls were not adequate to ensure that the Services cleared and disposed of range residue in a safe manner. The recommendations in this report, if implemented, will correct the material weaknesses identified. A copy of the report will be provided to the senior official responsible for management controls in OSD.

**Adequacy of Management's Self-Evaluation.** OSD had not identified the disposal of range residue as an assessable unit. However, OSD did report the management of UXO as a material management control weakness in its FY 1999 Annual Statement of Assurance and identified corrective measures.

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## **Appendix B. Prior Coverage**

During the last 5 years, the Inspector General, DoD, has issued four reports covering aspects of the disposal of munitions items. These reports can be accessed over the Internet at <http://www.dodig.osd.mil/audit/reports>.

### **Inspector General, DoD**

Inspector General, DoD, Report No. D-2000-050, "Disposal of Munitions Items at Fort Irwin," December 8, 1999.

Inspector General, DoD, Report No. 97-213, "Evaluation of the Disposal of Munitions Items," September 5, 1997.

Inspector General, DoD, Report No. 97-134, "Disposal of Munitions List Items in the Possession of Defense Contractors," April 22, 1997.

Inspector General, DoD, Report No. 97-087, "Evaluation of the Direct Sales of Recyclable Material," February 4, 1997.

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## Appendix C. Military Installations Reviewed

For our review, we visited eight military installations. Details on the installations visited and the results of our review are provided below.

### Fort Irwin

Fort Irwin, a subordinate organization of the U.S. Army Forces Command, is home to the National Training Center. The center provides a maneuver training capability for heavy mechanized units. The fort is located in Southern California and covers about 640,000 acres. Fort Irwin provides combat training to Army and National Guard units. Fort Irwin annually expends an estimated 3 million pounds of munitions on its ranges. The fort has been divided into grids 1 kilometer square for residue collection by a contractor at a cost of about \$6 million a year. The contractor is required to pick up all residue that is 6 inches or greater in length or is 4 ounces or more in weight. Emphasis is placed on collecting and disposing expended munitions to maintain targets and to secure the fort's two maneuver ranges. The fort's static ranges, used primarily for small arms and other fixed target training, are regularly maintained at points of fire by training units; down range is cleaned by the contractor on an as needed and as directed basis. The local environmental office identified one of the munitions expended at Fort Irwin as containing hazardous material and took steps to have its disposal contracted separately.

Fort Irwin's range cleaning and disposal process provided adequate assurance that UXO was not sold to the public. To clean its ranges of other than small-caliber expended cartridges, Fort Irwin relies on local EOD military assistance, contractor support, Government oversight, and DRMS sales capabilities. The contractor is responsible for the collection, demilitarization, and disposal of all range residue by grid as directed by Fort Irwin. The contractor is to clean the ranges in accordance with an approved work plan. Should the contractor come across UXO during range cleaning operations, he is required to mark it and contact the local EOD military detachment at Fort Irwin to detonate it. The contractor is required to certify all range residue as inert and hold it for sale by DRMS. Before certification, the contractor and a Government safety specialist perform a number of inspections. The residue is checked on the ground by contractor personnel and by the contractor's senior UXO-qualified personnel as it is put in trucks. The Government's safety specialist also spot checks the residue in the truck before it is taken to the contractor's secure holding area. At the holding area, the residue is inspected again by UXO-qualified contractor personnel as well as on a spot basis by the Government safety specialist. The residue is then segregated for demilitarization if appropriate and sorted by type

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of metal and caliber. Figure C-1 shows the contractor's secure holding area. Shown in the photograph are demilitarized 135mm rocket mortars and fins.

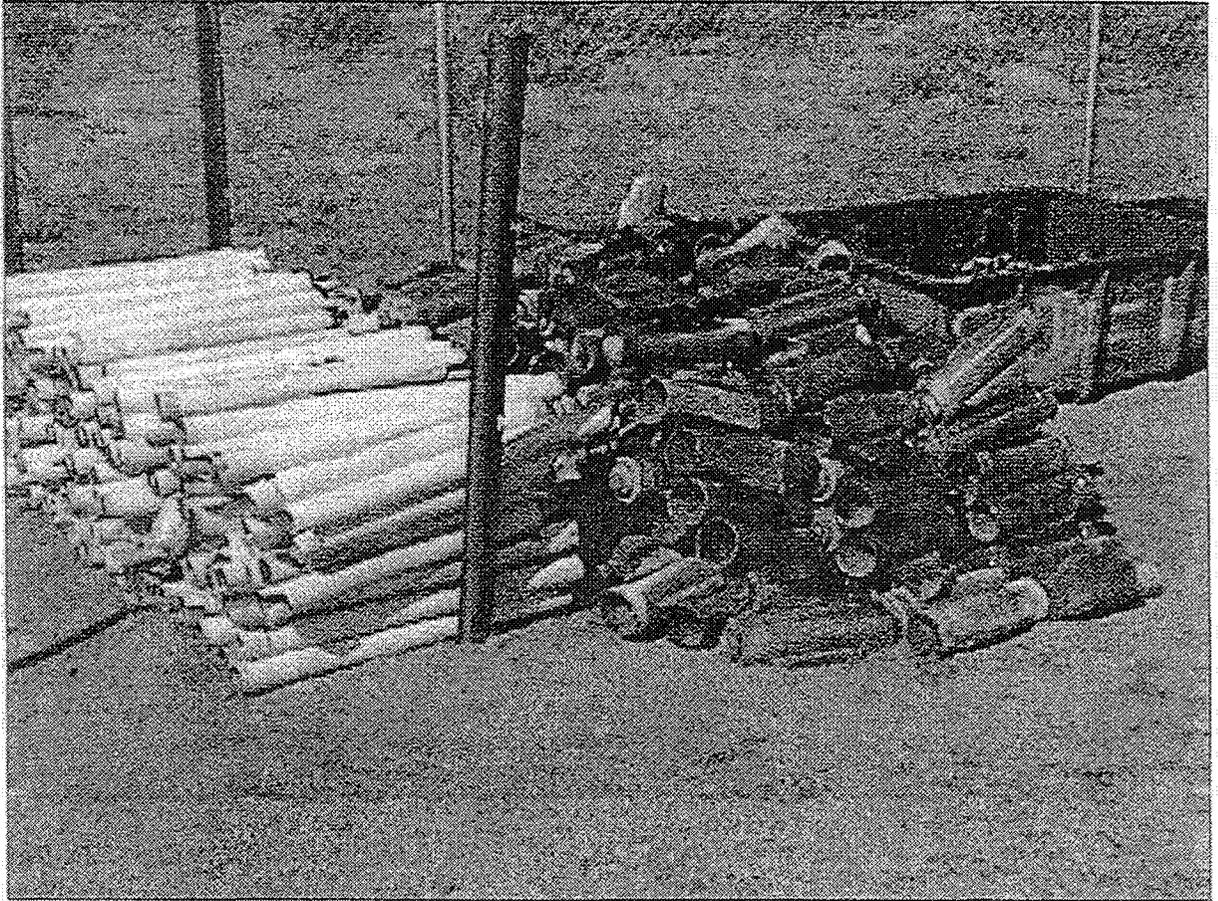


Figure C-1. Contractor's secure holding area at Fort Irwin

When enough residue has been accumulated for sale, DRMS is notified. Before sale, the contractor's quality control specialist and senior UXO-qualified personnel must certify that the residue is inert and meets demilitarization requirements. The Government safety specialist also must certify that at least 10 percent of the residue was inspected and that it contained no items of a dangerous nature. DRMS requires all purchasers of range residue to sign an end-use certificate, which identifies how the residue will be used and essentially restricts its transfer to U.S. citizens. No incidents of UXO causing injury or being misplaced were reported by Fort Irwin for the period we reviewed (October 1, 1998, through July 30, 1999).

The process for turning in small-caliber expended cartridges also ensured the public's safety. Upon completion of training, soldiers collect and turn in small-caliber expended cartridges to the ammunition supply point (ASP). The

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soldiers who actually collect the cartridges separate them from live ammunition. The soldiers who turn the cartridges in to the ASP perform a 100 percent inspection to ensure that no live ammunition is included; a noncommissioned officer, E-6 or higher, certifies that the cartridges are inert. ASP personnel also perform a 100 percent inspection of the turned-in cartridges. In addition, a quality assurance specialist (ammunition surveillance) spot checks the turned-in cartridges. The ASP reconciles or otherwise accounts for the turned-in munitions and expended cartridges in accordance with Army Pamphlet 710-2-1, "Using Unit Supply System (Manual Procedures)," February 28, 1994. However, because the cartridges are often expended during maneuvers and cannot be accounted for, the reconciliation process does not accurately identify differences between munitions issued and expended cartridges turned in. Reconciliation differences are documented and written off. ASP personnel certify that the expended cartridges are inert and turn them in to the local QRP center with a DD Form 1348-1, "Single Line Item Release/Receipt Document." The center then deforms and sells the cartridges.

Although the Army procedures for cleaning and disposing range residue have not changed since a commercial worker was killed by a live anti-tank munitions shell, Fort Irwin has changed or strengthened its range clearance and disposal process. After the incident in March 1997, Fort Irwin required the then contractor to reinspect the range residue that was on hand; however, the contractor did not comply. Accordingly, Fort Irwin found the contractor in default for inadequate quality control and, in May 1997, engaged the Huntsville Center to provide clearance and disposal services through its worldwide contract for range clearance. In addition to a new contractor, the agreement with the Huntsville Center included full-time, on-site contractor surveillance to include overseeing contractor operations in the field and ensuring all grids are properly cleaned. The contractor surveillance service, probably the most important factor in improving control over range residue at Fort Irwin, is performed by a Government safety specialist experienced in UXO. The contract, awarded on July 30, 1999, essentially contains the same cleaning specifications and contractor surveillance but is site-specific to Fort Irwin. Another significant change in the clearance and disposal process at Fort Irwin occurred when DRMS discontinued taking physical custody of range residue. In May 1997, DRMS declared that DRMOs would only sell range residue stored on military installations.

## **Fort Polk**

Fort Polk, a subordinate organization of the U.S. Army Forces Command, has been the home of the Joint Readiness Training Center since March 1993. The fort is located on approximately 100,000 acres in western Louisiana. The fort

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also has use of another 100,000 acres owned by the National Forest Service. Fort Polk's mission is to provide advanced joint training for U.S. forces under warfighting conditions, which it does by integrating the Services during joint training exercises. About 14,000 of the 200,000 acres of land owned or used by Fort Polk include live-fire areas. Fort Polk could not estimate the poundage of munitions it expends annually on its ranges. Due to a lack of funds, range cleaning at Fort Polk is limited to collecting expended munitions to maintain targets and to make the fort's maneuver range safe. Except for small-caliber expended cartridges, none of the residue is disposed of.

Fort Polk took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel, while expressing the desire to clean beyond impact areas and dispose of the residue, cited a lack of funds and the Munitions Rule as reasons for the current level of effort at Fort Polk. Range personnel told us that they did not know what cleaning and disposal techniques they should employ and were unsure as to how they were to acquire funds. They were also unsure how and when the Munitions Rule applied in the collection and disposal process of range residue. Concerning the Munitions Rule, Fort Polk had assessed one of its munitions for hazardous material.

Fort Polk's limited range cleaning and disposal process provided adequate assurance that UXO was not sold to the public. The cleaning process at Fort Polk entailed local EOD personnel sweeping impact areas after a firing exercise and detonating UXO. Subsequently, and as operational requirements dictated, they or other Government employees collect and place large residue and used targets in piles on the firing ranges. Figure C-2 shows a pile of range residue that had been collected on one of Fort Polk's ranges.



Figure C-2. Residue piled on range at Fort Polk

Because the residue was placed in piles and not disposed of, the public's safety was ensured.

The process for turning in small-caliber expended cartridges also ensured the public's safety. Upon completion of training, soldiers collect and turn in small-caliber expended cartridges to the ASP. The soldiers who actually collect the cartridges separate them from live ammunition. The soldiers who turn the cartridges in to the ASP perform a 100 percent inspection to ensure that no live ammunition is included; a noncommissioned officer, E-6 or higher, certifies that the cartridges are inert. ASP personnel also perform a 100 percent inspection of the turned-in cartridges. In addition, a quality assurance specialist (ammunition surveillance) spot checks the turned-in cartridges. The ASP reconciles or otherwise accounts for the turned-in munitions and expended cartridges in accordance with Army Pamphlet 710-2-1. However, because munitions "captured" during war games are turned in to the ASP through the amnesty program and no record is kept of who it was captured from, the reconciliation process does not always identify differences between munitions issued and expended cartridges turned in. Reconciliation differences are documented and written off. ASP personnel certify the expended cartridges are inert and turn them in to the DRMO for sale using a DD Form 1348-1. The DRMO also performs a 100 percent inspection of the turned-in cartridges. The controls in place at Fort Polk ensured that the expended cartridges sold by the DRMO were inert and did not constitute an explosives safety hazard. No incidents of UXO causing injury or being misplaced were reported by Fort Polk for the period we reviewed (October 1, 1998, through November 19, 1999).

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## Naval Air Warfare Center China Lake

Naval Air Warfare Center China Lake, a subordinate organization of the Naval Air Systems Command, is home to the Naval Air Warfare Center, Weapons Division. China Lake is located on about 1.1 million acres in the upper Mojave Desert of Southern California. Its primary mission is to support research, development, test, and evaluation of inert and live air-to-surface missiles and cluster bombs. China Lake annually expends an estimated 600,000 pounds of munitions on its ranges. Due to a lack of funds, ranges are cleaned only to maintain targets. None of the residue is disposed of.

China Lake took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel, while expressing the desire to clean beyond impact areas and dispose of the residue, cited a lack of funds for the current level of effort at China Lake. Range personnel told us that they were unsure what cleaning and disposal techniques they should employ and were unsure how they were to acquire funds. Tentatively, however, range personnel believed that an in-house operation would be best to run a range cleaning and disposal process at China Lake. Toward that end, China Lake built a secure storage area for inert residue with about \$50,000 of environmental funds in FY 1999 and requested about \$3.5 million of military construction funds in FY 2000 to establish a staging site and acquire the requisite equipment for rendering munitions inert and unusable for their original military purpose. The request was prioritized and programmed for FY 2004. During FY 1999, China Lake also engaged in-house personnel with UXO experience to clean one of its "bone yards"; that is, test ranges no longer in use but still littered with all types of equipment and range residue. Figures C-3 and C-4 show the bone yard before and after it was cleaned.



Figure C-3. China Lake bone yard littered with equipment and range residue, January 1999

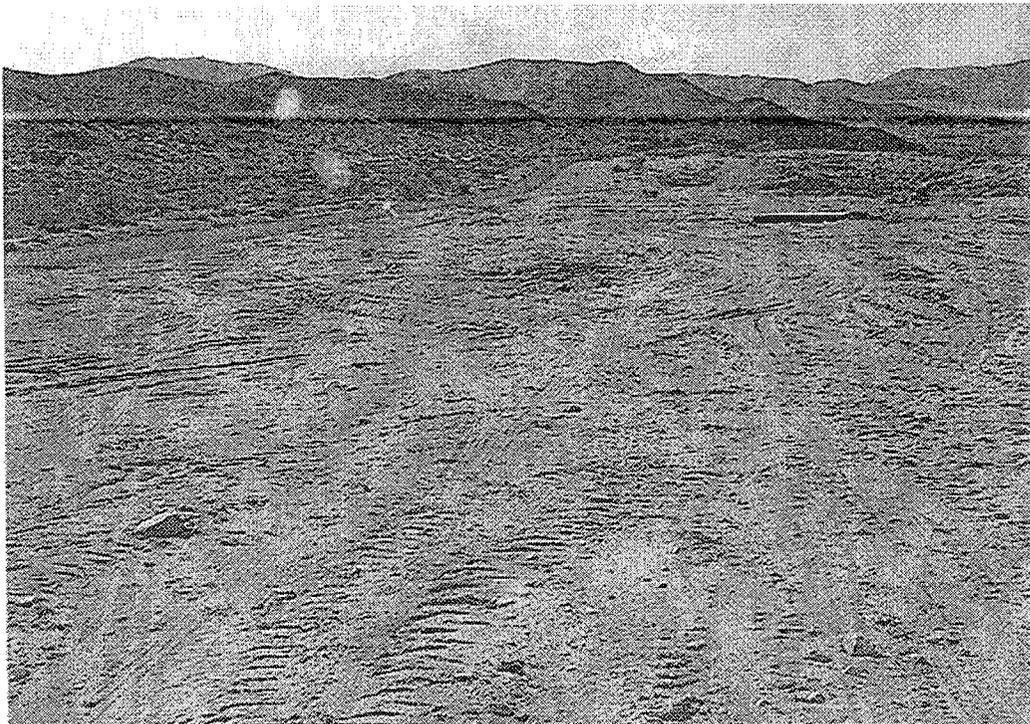


Figure C-4. China Lake bone yard cleaned of equipment and range residue, August 1999

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Range personnel were also unsure how and when the Munitions Rule applied in the collection and disposal process of range residue. Concerning the Munitions Rule, China Lake had not assessed any expended munitions for potentially hazardous materials.

China Lake's limited range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. The range cleaning process at China Lake entailed local EOD personnel sweeping impact areas after a firing exercise and detonating UXO. Subsequently, and as operational requirements dictated, they or the target maintenance contractor collect and place large residue and used targets in piles on the firing ranges. Because none of the residue in piles has been disposed of, the public has been protected. No incidents of UXO causing injury or being misplaced were reported by China Lake for the period we reviewed (October 1, 1998, through October 22, 1999).

## **Naval Air Station Fallon**

Naval Air Station Fallon is part of Navy Region Southwest, which is subordinate to the Commander in Chief, Pacific Fleet. The region includes three bombing range complexes: Fallon; El Centro, California; and San Clemente Island, California. Fallon is the Navy's primary graduate-level training school. Fallon is located in west-central Nevada on about 242,000 acres, of which 234,000 are devoted to four separate training ranges. Fallon annually expends an estimated 15 million pounds of munitions on its ranges. Due to a lack of funds, ranges are cleaned only to maintain targets. Except for small-caliber expended cartridges, none of the residue is disposed of.

Fallon took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel expressed the desire to do more widespread cleaning and disposing of residue but were unsure of how to proceed. Navy Region Southwest requested \$2 million in FY 2001 funds to clean the ranges within its three complexes. Preliminarily, range personnel were considering using an existing Air Force contract to clean the complexes and dispose of residue, or possibly the Army Ammunition Plant at Hawthorne, Nevada, to satisfy demilitarization and disposal requirements. Fallon had not performed any assessments to determine whether its range residue contained hazardous material.

Fallon's limited range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. The range cleaning process at Fallon entails EOD personnel sweeping target areas two or three times a year and detonating UXO. Subsequently, and as operational requirements dictate,

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the target maintenance contractor relocates large residue and used targets in impact areas to piles on the ranges. Figure C-5 shows a pile of expended munitions on one of Fallon's ranges.

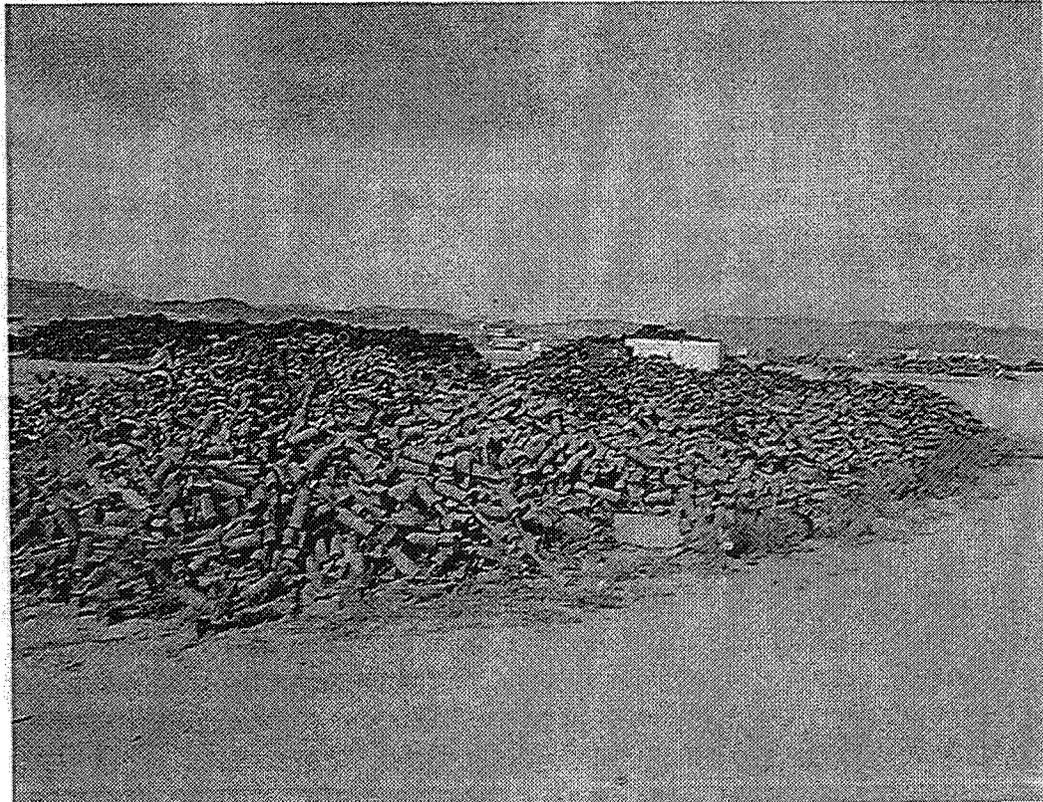


Figure C-5. Expended munitions piled on a range at Fallon

Expended cartridges are accounted for by weapons personnel who load and unload training aircraft. After a training mission, weapons personnel gather small-caliber expended cartridges and inspect, segregate, and certify them as inert. The cartridges are then sealed in a barrel and sent to the regional QRP center, which deforms and sells them. No reconciliation is made of munitions issued to munitions expended and turned in. The controls in place at Fallon ensured that the expended cartridges sold by the regional QRP center were inert and did not constitute an explosives safety hazard. However, we noted that the Fallon QRP center accepted 20mm expended cartridges, although DoD Manual 4160.21-M only authorizes direct sales of expended small-caliber cartridge cases (.50 caliber or less).

No incidents of UXO causing injury or being misplaced were reported by Fallon for the period of our review (October 1, 1998, through February 16, 2000). However, Fallon constantly needed to be on guard for trespassers picking up scrap. All of its ranges border public lands and there have been five

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documented instances of trespassers since October 1, 1999. On January 14, 2000, several trespassers were arrested for stealing scrap from a pile on the range.

## **Eglin Air Force Base**

Eglin Air Force Base, a subordinate organization of the Air Force Materiel Command, is the nation's premier center for developmental testing of air-delivered conventional weapons. The base is located in northwestern Florida and consists of 463,000 acres, of which about 50,000 are used for test ranges. Besides developmental testing, Eglin's ranges are used for operational training by ground troops and pilots. Eglin annually expends an estimated 3 million pounds of munitions on its ranges. Due to a lack of funds, ranges are cleaned only to maintain targets. Except for targets, none of the range residue is disposed of.

Eglin took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel told us that they were unsure as to what cleaning and disposal techniques they should employ and had requested \$100,000 in FY 2001 for an environmental project to determine the best way to surface clean and dispose of range residue. No funds had been requested for actually cleaning and disposing range residue. Concerning the Munitions Rule, Eglin had not assessed its expended munitions for potentially hazardous materials.

Overall, Eglin's limited range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. The cleaning process at Eglin entails EOD personnel sweeping impact areas and detonating UXO. Subsequently, and as operational requirements dictated, the target maintenance contractor relocates residue (unrecognizable metal scrap) and destroyed targets certified as inert by EOD personnel. Inert residue is placed in a concrete recycle bin at a secure staging area on a range and held for future sale. Destroyed targets are placed on an auxiliary airfield where they are numbered and tracked by Eglin personnel until sold as scrap by the local DRMO. Before a buyer can remove the targets, EOD personnel ensure that they have been properly demilitarized and are free from explosives. That process deals with destroyed targets that were used in recent years and predetermined to be environmentally safe. Older targets that may contain hazardous materials were stockpiled on the ranges. Figure C-6 shows those destroyed targets stockpiled on a range at Eglin.



Figure C-6. Destroyed targets stockpiled on a range at Eglin

There has been a program in place since 1993 to identify and remove environmental hazards from the older destroyed targets.

Because of the controls over the limited range residue that was disposed of, the public was protected. However, while Eglin's limited cleaning and disposal process protected the public from sales of UXO, a more aggressive cleaning operation may have prevented a UXO incident involving a National Guard member on training. In March 1999, a Guard member was seriously injured when he picked up and improperly handled a piece of UXO on a live-fire range. The Guard member was part of a unit that was accidentally bivouacking on the firing range. A subsequent sweep of the area found four more UXO: 20mm and 25mm incendiary projectiles and 105mm training projectiles.

## **Nellis Air Force Base**

Nellis Air Force Base, a part of the Air Force's Air Combat Command, is the Air Force's center for advanced combat aviation training. The base is located in southern Nevada and covers more than 3 million acres. The main area of the training, the Nevada Test and Training Range, provides training for composite strike forces, which include every type of aircraft in the Air Force inventory. Training is also conducted in conjunction with air and ground forces of the

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Army, the Navy, and the Marine Corps, as well as allied forces from around the world. Air training is performed at three major range areas: North and South of the Nevada Test and Training Range, and Leach Lake.

- The North area includes electronic warfare and live and inert bombing areas.
- The South area includes the Silver Flag Alpha range for static ground firing. Approximately 3,600 Air Force security police and other law enforcement personnel as well as Army, Navy, and Marine units train at the Silver Flag Alpha range. Ordnance expended on live-fire ranges at Silver Flag Alpha includes a wide variety of small arms munitions, rifle and machine gun ammunition, and anti-tank rounds.
- The Leach Lake range is actually located on Fort Irwin and supports Air Warrior, a joint service exercise employing Air Force and Army elements. Nellis oversees the contract for the management of all range residue generated at Leach Lake.

Nellis annually expends an estimated 4 million pounds of munitions on its ranges. Until 1991, when new environmental laws prohibited the practice, the residue collected from Nellis ranges was buried. Afterward, Nellis engaged a contractor to collect and store range residue in five staging areas. However, in 1997, Nellis did an environmental self-assessment and concluded that the State of Nevada could declare the staging areas illegal dumping sites with resultant fines. The environmental self-assessment aided Nellis in obtaining funds to clean its ranges. For range cleanup purposes, the Nellis ranges are each divided into five grids. All grids at Nellis must be cleaned within a 5-year period; however, immediate emphasis is given to the maintenance of targets.

Nellis's range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. To clean its ranges of other than expended cartridges, Nellis relies on its own EOD personnel, contractor support, and Government surveillance. Before collecting any range residue, Nellis cleanup areas are swept by EOD personnel for UXO. Range cleaning and disposal operations are accomplished through three contracts.

- The first contract is for the collection, demilitarization, and disposal of range residue at the Leach Lake range. The contractor provides all services and materials to place targets and clean the range. The contractor also maintains his own EOD capability and recycling or disposal source. The contract incorporates a "triple check" process, performed by a third-party quality assurance specialist, to ensure that no UXO leaves Leach Lake. Scrap metal is sorted, deformed to a non-recognizable state, and put into large metal containers for sale to

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a scrap metal recycler. Once a container is filled, it is sealed and certified inert by a UXO-qualified person employed by the contractor. The sealed container is picked up by the scrap metal recycler and taken directly to his smelting facility. A chain of custody document accompanies each shipment to its final destination. The recycling process ensures minimal risk to the public. Contract costs are offset by money recouped from the recycled metals.

- The second contract is for the collection and placement of range residue in five staging areas on the Nevada Test and Training Range, which the contractor does after Nellis EOD personnel have swept for any UXO. To facilitate the demilitarization and disposal process, the staging areas are segregated by the type of residue: a pile for targets and a pile for expended ordnance.
- The third contract is for the demilitarization and disposal of all range residue collected and placed in the five staging areas on the Nevada Test and Training Range. The contractor maintains his own EOD capability and recycling or disposal source. The contract incorporates a “triple check” process, performed by a third-party quality assurance specialist, to ensure that UXO does not leave Nellis. The contractor ensures all range residue is destroyed to a non-recognizable state. For example, the contractor splits inert ordnance (bombs over 200 pounds) to remove the concrete filler and destroy the casing so it no longer looks like a bomb, as shown in Figure C-7. Contractor UXO-qualified personnel are on hand to observe the process and identify any live ordnance. The contractor subsequently performs the same process as described for Leach Lake to convey the scrap metal to a recycler.



Figure C-7. Inert bombs being split at Nellis

Minimal Government quality assurance is required for each contract. Military quality assurance specialists inspect each contractor operation once a month or as required. The inspections are based on a quality assurance inspection plan and checklist. Checks are made to ensure that the ranges are cleaned as required and that contractor personnel receive proper training.

Nellis's process for turning in small-caliber expended cartridges also ensured the public's safety. Expended cartridges found at points of fire at the Silver Flag Alpha range are collected by training units. The cartridges are inspected and certified as inert, turned in to the Nellis ASP, and sold through the local DRMO with proceeds being returned to Nellis for morale, welfare, and recreation activities. The ASP does not perform a reconciliation of munitions issued to munitions expended. Concerning the Munitions Rule, Nellis had not assessed its expended munitions for potentially hazardous materials.

## **Marine Corps Air Ground Combat Center, Twentynine Palms**

The Marine Corps Air Ground Combat Center, Twentynine Palms, a subordinate command of Marine Forces Pacific, is responsible for conducting the Marine Corps Combined Arms Training Program. Twentynine Palms is located in Southern California and covers about 932 square miles of land. It has 23 ranges (21 active) that have been used for live-fire exercises and maneuvers since 1952. One of the ranges, encompassing most of the installation, is for

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live-fire training. Twentynine Palms annually expends an estimated 82 million pounds of munitions on its ranges. Before 1995, range residue was collected and stored on ranges in small piles. From 1995 until 1998, EOD personnel collected and moved range residue to a stockpile located on a range in a box canyon (a canyon with three sides). However, that procedure was halted because a storm washed out the only road into the box canyon. Figure C-8 shows a stockpile still on hand in the box canyon.



Figure C-8. Box canyon at Twentynine Palms

Due to a lack of funds, ranges are cleaned only to make maneuver areas safe and gather small-caliber expended cartridges. Only the expended cartridges are disposed of.

Twentynine Palms took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel told us that they were unsure as to what cleaning and disposal techniques should be employed, but were working to develop a total waste management initiative that would include range residue. No funds had been requested for cleaning ranges and disposing residue. Range personnel also showed us 33 assessments of munitions that were

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contracted for to determine whether hazardous materials were present. Tentative results indicated that the residue of two munitions could be classified as hazardous waste because of elevated sulfide levels.

Twentynine Palms' limited range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. The range cleaning process entails EOD personnel sweeping maneuver areas and detonating UXO. All residue is left in place. Small-caliber expended cartridges are picked up by units, which are required to perform a 100 percent inspection of the cartridges, certify them as inert, and turn them in directly to the local DRMO. The DRMO maintained an up-to-date file of letters from each unit turning in cartridges that authorized specific individuals to sign inert certification statements and provided their signatures. Units are cleared to leave the range after a range safety officer has satisfied himself that the range has been satisfactorily cleaned.

Although Twentynine Palms' limited cleaning process indirectly protected the public from sales of UXO, a more aggressive cleaning operation and disposal process may have prevented potential explosives safety incidents from occurring. The range cleaning and disposal operation in place at Twentynine Palms did not ensure against the public having access to UXO. Since October 1, 1998, Twentynine Palms performed 14 24-hour range patrols and sighted trespassers on 7 of the patrols. Also, since October 1, 1998, Twentynine Palms reported 67 incidents of ordnance being found where it should not have been. Of the 67 incidents, 14 were off base, 15 were at the servicing DRMO, and 38 were on base. The incidents at the DRMO involved small quantities of live ammunition mixed in with the expended cartridges that had been turned in. During our review, we found range residue at one range that had been collected and sorted but had not been removed. The range safety officer told us that it is not unusual for a unit to be cleared from a range by radio and allowed to leave trash and residue for pickup later. However, in the interim, UXO could be added to sorted residue.

Also, while reviewing base security, we found 18 live rounds of linked .50-caliber armor-piercing bullets on the side of a road about a quarter of a mile from the border of the base and about a mile from an off-base neighborhood. We found the bullets on a secondary, unguarded road that is primarily used for bringing ammunition on base. Although the road is restricted to use by official Government vehicles and is patrolled 2 or 3 times a week, we saw a Marine leaving the base on the road in his private vehicle.

## **Marine Corps Air Station Yuma**

The Marine Corps Air Station Yuma, a subordinate command of Marine Forces Pacific, is responsible for providing full-spectrum support of Marine Corps

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tactical aviation training. Training is provided through the Yuma Training Range Complex. The complex consists of two primary ranges: Goldwater and Chocolate Mountain. The Goldwater range covers about 650,000 acres in southwestern Arizona and is used for inert bombing. The Chocolate Mountain range covers about 460,000 acres in southeastern California and is used for inert and high-explosive bombing. Yuma annually expends about 3 million pounds of munitions on its ranges. Due to a lack of funds, ranges are not cleaned. Only cartridges expended in helicopters during joint training exercises and at rifle and pistol ranges are collected and disposed of.

Yuma took preliminary steps to more thoroughly clean its ranges and dispose of the buildup of residue. Range personnel told us that they would like to adopt the process in place at Nellis; that is, a commercial contractor would take full control of the collection and disposal process of residue to include ensuring that the residue is melted. To that end, Yuma had made inquiries of several contractors and had requested \$1.5 million for FY 2001. Concerning the Munitions Rule, Yuma had not assessed any of its expended munitions to determine whether they contained potentially hazardous materials.

Yuma's limited range cleaning and disposal operation provided adequate assurance that UXO was not sold to the public. The range cleaning process entails EOD personnel sweeping impact areas and detonating UXO. In the past, inert ordnance and used targets were collected and placed in staging areas within the range boundaries. None of the residue has been removed for at least 5 years, thus protecting the public. Cartridges expended in helicopters and at rifle and pistol ranges are collected by units, which are required to perform a 100 percent inspection of the cartridges and transport expended cartridges to a secure holding area. Subsequently, the cartridges are reinspected and certified inert by local weapons personnel before they are transported to the local QRP center for sale. The QRP center deforms the cartridges before selling them.

The controls in place at Yuma ensured that the expended cartridges sold by the QRP center were inert and did not constitute an explosives safety hazard. However, we noted that the Yuma QRP center accepted 20mm expended cartridges and larger munitions, although DoD Manual 4160.21-M only authorizes direct sales of expended small-caliber cartridge cases (.50 caliber or less). At the QRP center, two inert 6-foot bombs were turned in, accepted, and sold just prior to our review. No paperwork or inert certification accompanied the turn-in or sale; however, personnel told us that the bombs had been used as a display in front of a building. The bombs were subsequently retrieved and taken to a range and blown up in case they were not inert. Figure C-9 shows the inert 6-foot bombs being returned to the Yuma QRP center.

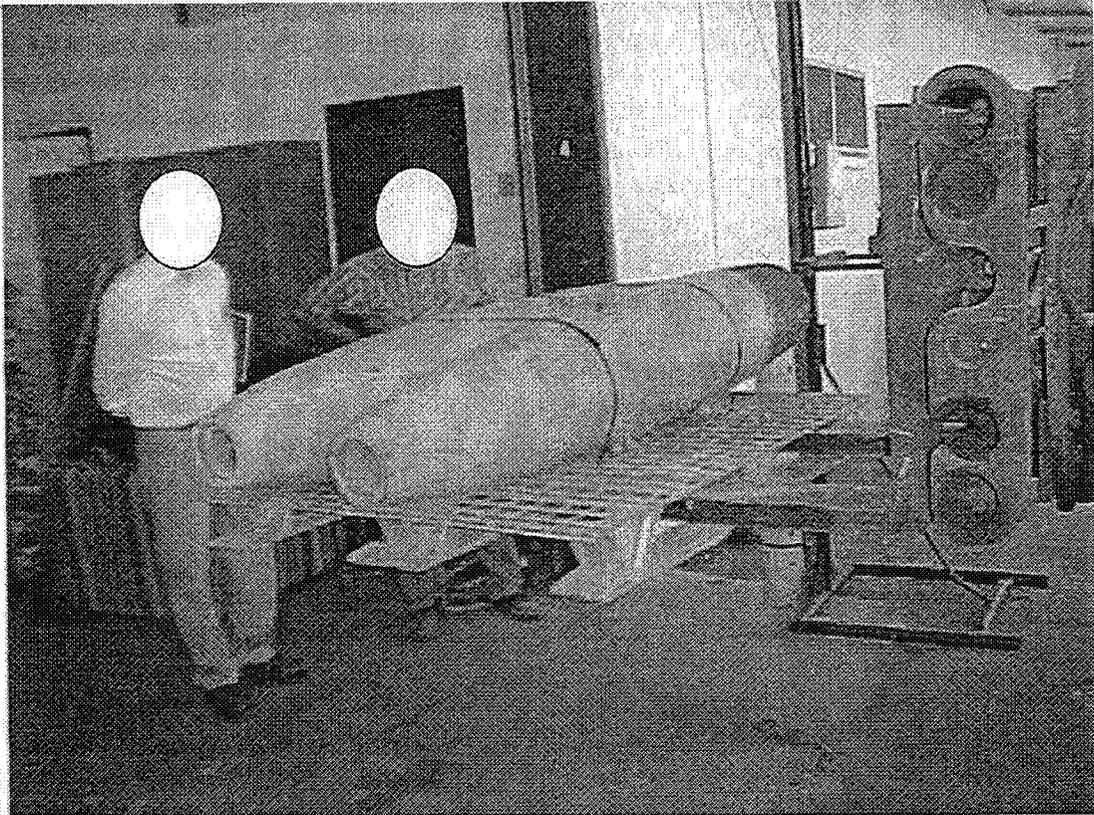


Figure C-9. Inert 6-foot bombs returned to the Yuma QRP center

No incidents of UXO causing injury or being misplaced were reported by Yuma for the period we reviewed (October 1, 1998, through October 27, 1999).

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## Appendix D. Status of Actions Taken in Response to Prior Report

Inspector General, DoD, Report No. 97-213, "Evaluation of the Disposal of Munitions Items," September 5, 1997, contained 25 separate recommended actions: 15 to the Under Secretary of Defense for Acquisition, Technology, and Logistics; 3 to the Military Departments; 6 to the Commander, DRMS; and 1 to the Commander, Fort Lewis. The 25 recommended actions (in italics), management response, and our evaluation of management actions follow.

*Recommendation A.1. We recommended that the Under Secretary of Defense for Acquisition, Technology, and Logistics develop standard DoD-wide policy, procedures, and training that provide specific instructions on how and what ammunition, explosives, and other dangerous articles (AEDA) residue is collected, rendered inert, accounted for, inspected and reinspected, accumulated and stored, certified, cleaned up, and physically secured. We further recommended that the Under Secretary establish an integrated process team to partner the DoD environmental, EOD, demilitarization, munitions, safety, and training staffs to accomplish the following actions.*

*a. Develop a corrective action plan to implement the recommendations in the Inspector General, DoD, Report, "Review of Policies and Procedures Guiding the Cleanup of Ordnance on DoD Lands," November 22, 1994.*

*b. Develop standard DoD-wide accountability requirements for AEDA residue. The integrated process team should consider adopting Army reconciliation procedures, where practicable.*

*c. Develop DoD-wide policies and procedures that provide specific instructions on the number and type of inspections as well as the training and qualifications required of personnel designated to inspect and certify AEDA residue as inert.*

*d. Develop DoD-wide policies and procedures for the disposal or turn-in of accumulated AEDA on a specific time interval or weight basis.*

**Management Response.** The Under Secretary agreed and stated that corrective actions had already been initiated through an ad hoc working group composed of the various organizations involved in the munitions disposal process. The projected completion date was December 1997. The Under Secretary noted that the 1994 Inspector General, DoD, report had already been used in several of its studies of environmental security issues.

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**Evaluation of Management Action.** As of March 31, 2000, the Under Secretary had not developed standard DoD-wide policy, procedures, and training that provided specific instructions on how and what AEDA residue is collected, rendered inert, accounted for, inspected and reinspected, accumulated and stored, certified, cleaned up, and physically secured. The Under Secretary conducted a DoD Munitions Residue Disposal Process Review, headed by the Deputy Under Secretary of Defense (Logistics). Team members were from the Services, DLA, and OSD. They represented the operations, logistics, test and evaluation, environmental, explosives safety, and EOD communities. The results of the review are contained in a working draft report dated June 30, 1999. The draft report contains no standard DoD-wide policy, procedures, and training for managing the disposal of AEDA.

- The draft report does not discuss accountability in terms of controlling the quantity of expended munitions generated, as required by Army regulation and as recommended by us in 1997. The draft report discusses accountability in relationship to the RCRA, which deals with disposal of hazardous waste.
- The draft report discusses inspections and training, reiterating what was reported by us in 1997--that the number of inspections and level of training varied among the Services. However, the draft report contains no standard DoD-wide policies and procedures for inspections and the training and qualification of inspectors.
- The draft report discusses the accumulation of range residue on ranges, again reiterating our 1997 report--that there is no maximum limitation on the accumulation of AEDA before disposal or turn-in. However, the draft report contains no DoD-wide policies and procedures for the disposal or turn-in of accumulated AEDA.

The Under Secretary also conducted several studies of environmental security issues and, although the use of the Inspector General, DoD, 1994 report is at least partially responsive to our recommendation, the Under Secretary's lack of specifics prevented us from evaluating the degree our report was used or the impact it had on the studies. Nevertheless, the Under Secretary subsequently directed OEESCM to develop a munitions action plan, which has as one of its objectives the development of guidance for the Services concerning ranges. An OEESCM working group plans to address the recommendations in our 1997 report and to issue implementing guidance in the summer of 2001 for managing and disposing material potentially containing explosives.

*Recommendation A.2. We recommended that the Deputy Under Secretary of Defense (Environmental Security) partner with the DoD Unexploded Ordnance Center of Excellence to develop short- and long-term DoD-wide policies,*

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*procedures, and goals for cleanup and clearance of active DoD ranges in the area of detecting and neutralizing unexploded ordnance, oversight, and coordination of technology developments supporting range clearance; and evaluate the cost-effectiveness of cleaning potentially harmful AEDA on a regional basis.*

**Management Response.** The Deputy Under Secretary agreed and identified additional organizations that should join the partnering effort or assist in resolving range clearance issues. The Deputy Under Secretary also noted that an integrated process team (OEESCM) already exists that addresses ordnance-related environmental and safety concerns. No date was provided as to when the partnering effort was to be completed.

**Evaluation of Management Action.** As of March 31, 2000, the Deputy Under Secretary had not developed short- and long-term DoD-wide policies, procedures, and goals for cleanup and clearance of active DoD ranges. The OEESCM work on range clearance issues is reflected in DoD Directive 4715.11, August 17, 1999, which addresses environmental and safety issues on active ranges within the United States. The directive establishes policy and assigns responsibilities for sustainable use and management of active and inactive ranges. The directive appears comprehensive in establishing policy and assigning responsibilities, particularly to the Services. However, the directive states that the Under Secretary of Defense for Acquisition, Technology, and Logistics must develop acquisition plans, strategies, guidance, and assessments to implement the directive. As of March 31, 2000, that had not been done.

**Recommendation A.3.** *We recommended that the Military Departments:*

*a. Conduct compliance staff reviews of organizations involved in the disposal of AEDA to ensure that AEDA residue is segregated from other scrap material, and the certification process is sound.*

*b. Assess the risk of public access to military installations with firing ranges, and establish security measures, such as fencing and using detection devices, alarms, lighting, patrols, guards, and signs, commensurate with the risk, as practicable.*

*c. Establish criteria for subordinate organizations to suspend the turn-in of AEDA residue to DRMOs when incidents of live explosives are found during the munitions disposal process.*

**Army Response.** The Army concurred with making compliance staff reviews and stated that under the provision of Army Regulation 700-13, "Worldwide Ammunition Review and Assistance Program," November 20, 1991, the Office

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of the Deputy Chief of Staff for Logistics periodically conducts reviews of all organizations with a mission for the receipt, storage, or issue of ammunition. The Army advised that it would make AEDA residue disposal a special item of interest for all future compliance staff reviews. The Army also agreed to make risk assessments and stated that management control requirements, to include risk assessment of and controlling access to ranges, would be included in a revision to Army Regulation 385-63, "Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat," October 15, 1983, to be published in FY 1998. In the near-term and pending publication of Army Regulation 385-63, the Director of Army Safety would publish guidelines to installation commanders, requiring them to conduct risk assessments of access to firing ranges, to take appropriate action to control access commensurate with risk, and to report back to headquarters, Department of the Army. The projected completion date for the near-term actions was the second quarter, FY 1998. The Army further agreed with the need to establish criteria for suspending the turn-in of AEDA to DRMOs but stated the issue should be jointly addressed by the Under Secretary of Defense for Acquisition, Technology, and Logistics.

**Navy Response.** The Navy agreed with making compliance staff reviews and stated that the Chief of Naval Operations issued a message to ordnance handling and storage facilities to conduct a review of demilitarization and scrap turn-in procedures and report on their compliance with those procedures. All units reported they were in compliance on June 15, 1997. Further, the units were advised that the DoD Explosives Safety Board and Naval Ordnance Center Explosives Safety Inspections would address those issues as a special item of interest in all future reviews. The Navy did not agree to make risk assessments and stated that its ongoing comprehensive and systemic assessment program complies with the intent of the recommendation. The Navy also stated that its guidance (Office of the Chief of Naval Operations Instruction 5530.13B, "Department of the Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives," July, 5, 1994, and Office of the Chief of Naval Operations Instruction 5530.14C, "Navy Physical Security," December 10, 1998) provides for an annual physical security survey of all installations, and that it would continue to review and assess the risk of public access to its firing ranges and adjust security measures as deemed appropriate after each annual review. The Navy agreed with the need to establish criteria for suspending the turn-in of AEDA to DRMOs but stated the issue should be jointly addressed by the Under Secretary of Defense for Acquisition, Technology, and Logistics.

**Air Force Response.** The Air Force agreed with making compliance staff reviews and stated that the Air Force conducts staff reviews of activities that turn in AEDA. The Air Force did not agree with making risk assessments and stated that its ongoing comprehensive and systemic assessment program

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complies with the intent of the recommendation. The Air Force added that its guidance (Air Force Instruction 31-209, "The Air Force Resource Protection Program," December 1, 1995, and Air Force Manual 36-2227, volume 1, "Combat Arms Training and Maintenance Training Management and Range Operations," February 1, 1996) provides for an annual physical security survey of all firing ranges, and that it would continue to review and assess the risk of public access to its firing ranges and adjust security measures as deemed appropriate after each annual review. The Air Force agreed with the need to establish criteria for suspending the turn-in of AEDA to DRMOs but stated the issue should be jointly addressed by the Under Secretary of Defense for Acquisition, Technology, and Logistics.

**Evaluation of Management Action.** Compliant staff reviews and risk inspections performed by the Military Departments would be responsive to our recommendation. However, none had been performed at the eight military installations selected for our current review since October 1, 1998. The DoD Munitions Residue Disposal Process Review addressed the issue of suspension criteria in its draft report; however, the issue is no longer compelling because, under DRMS policy issued in 1997, DRMOs will not accept custody of any AEDA except expended small arms cartridges and artillery cases. In addition, Army Regulation 385-63 had not been revised as of January 31, 2000.

**Recommendation B.1.** *We recommended that the Deputy Under Secretary of Defense (Logistics) revise DoD Manuals 4160.21-M and 4160.21-M-1 to establish requirements to:*

*a. Obtain from generators of AEDA residue a listing of the name, grade, rank, and sample signature of each individual authorized to certify items as inert on the DD Forms 1348-1.*

*b. Segregate material generated from AEDA from other scrap material in the DRMO or any other storage areas.*

*c. Perform visual inspections to recognize potential ordnance safety hazards upon turn-in of material generated from AEDA.*

**Management Response.** The Deputy Under Secretary agreed and stated that policy revisions were already underway for the disposal and demilitarization manuals. The projected completion date was December 1997.

**Evaluation of Management Action.** DoD Manuals 4160.21-M and 4160.21-M-1 were revised in draft form to implement the recommended actions in a satisfactory manner, although as of January 31, 2000, the drafts had not been finalized. The actions taken are responsive to the recommendation.

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However, the issue is no longer compelling because, under DRMS policy issued in 1997, DRMOs will not accept custody of any AEDA except expended small arms cartridges and artillery cases.

*Recommendation B.2. We recommended that the Commander, DRMS, establish or strengthen, as appropriate, controls to ensure compliance with guidance. Specifically,*

*a. Direct the DRMOs to:*

*(1) Obtain the generator's list that includes the printed name, grade, rank, and sample signature of the individual authorized to certify AEDA residue as inert and require an updated list on a periodic basis.*

*(2) Accept physical custody only of AEDA scrap that has been properly certified and that is accompanied by a DD Form 1348-1 that contains the name, grade, rank, and signature of an authorized individual.*

*b. Establish interim procedures requiring DRMO personnel to segregate material generated from AEDA from other scrap material in DRMO storage areas.*

*c. Establish interim procedures requiring DRMO personnel to perform visual inspections to detect potential ordnance safety hazards.*

*d. Develop uniform training requirements for all personnel at DRMOs who handle AEDA and range residue to include, as a minimum, specific conditions for the acceptance of turn-in documents and basic ordnance identification.*

*e. Conduct more compliance reviews to ensure that DRMOs follow established procedures to prevent live AEDA from being sold to the public.*

**DRMS Response.** DRMS generally agreed and stated that most corrective actions would be taken by December 1997. However, DRMS also stated that it had directed DRMOs to cease accepting either accountability or custody of range residue material, except expended small arms cartridges and artillery cases.

**Evaluation of Management Action.** Actions taken by DRMS are responsive.

*Recommendation C.1. We recommended that the Under Secretary of Defense for Acquisition, Technology, and Logistics establish a subgroup of the integrated process team to develop standards for qualified bidders lists for contractors in the disposal of AEDA residue, and develop preaward survey criteria for all sales contracts of range residue.*

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**Management Response.** The Under Secretary generally agreed, stating that an ad hoc group would explore ways to pursue the recommended objectives. The projected completion date was December 31, 1997.

**Evaluation of Management Action.** As of March 31, 2000, the Under Secretary had not developed standards for qualified bidders lists for contractors in the disposal of AEDA residue, or developed preaward survey criteria for all sales contracts of range residue. The DoD Munitions Residue Disposal Process Review developed no standards for qualified bidders or preaward criteria. Instead, the review's June 30, 1999, draft report discusses aspects of contracting and recommends that the Director, Defense Procurement, should require Military Components to include the following in solicitations when the purpose of a contract is to acquire services for range clearance.

Qualification requirements a contractor must meet in order to be considered eligible for award.

Information about such qualifications (for example: licenses, permits, personnel training data, quality assurance plans) to be included in the offeror's proposal.

In effect, the draft report recommends that the Director, Defense Procurement, have the Military Components do what we recommended in 1997. Accordingly, there are no plans to develop DoD-wide standards that contractors must meet and be evaluated against.

*Recommendation C.2. We recommended that the Director, Defense Procurement, revise the Defense Federal Acquisition Regulation Supplement to incorporate uniform and specific guidance to contracting officers on what requirements documents shall be used to obtain contractor compliance with DoD-wide policies, procedures, and standards for the disposal and sale of AEDA residue. As a minimum, DoD needs uniform contract provisions that specify contract qualifications and training, methods of work for range clearance, site quality control and assurance plans, and site-specific safety and health plans.*

**Management Response.** The Under Secretary of Defense for Acquisition, Technology, and Logistics agreed with the recommendation and stated that the Defense Acquisition Regulations Council would be asked to open a new Defense Federal Acquisition Regulation Supplement case to consider the recommendations to expand the general guidance on what to consider when contracting for disposal. The Under Secretary stated the specific changes requested would be addressed on a case-by-case basis in the requirements documentation. The projected completion date was December 1997.

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**Evaluation of Management Action.** As of March 31, 2000, the Under Secretary had not developed uniform contract requirements and provisions for ensuring compliance with DoD-wide policies, procedures, and standards for disposing of AEDA. Although a Defense Acquisition Regulation Supplement case was opened, it was subsequently closed and the matter was taken up by the DoD Munitions Residue Disposal Process Review. The DoD Munitions Residue Disposal Process Review did not develop uniform contract requirements and provisions for ensuring contractor compliance with DoD-wide policies, procedures, and standards for disposing of AEDA. Instead, the review's June 30, 1999, draft report states that the Defense Federal Acquisition Regulation Supplement, part 223, includes guidance on safeguarding sensitive conventional arms, ammunition, and explosives as well as guidance for identification, storage, and disposal of toxic and hazardous materials. The draft report also states that, although some guidance is necessary, the more specific the guidance, the less opportunity there is for commercial practices and innovative methods employed by the contractor. Nevertheless, the draft report recommends that the Director, Defense Procurement, require the Services to include the following in range clearance service contracts.

Any government-mandated special AEDA work method or other requirements in the description/ specifications/ statement of work and

Data requirements for such things as incident reports or quality process audit and certification results data.

In effect, the draft report recommends that the Director, Defense Procurement, have the Services do less than what we recommended in 1997. Accordingly, there are no plans to develop uniform contract requirements and provisions for ensuring contractor compliance with DoD-wide policies, procedures, and standards for disposing of AEDA.

***Recommendation C.3.*** *We recommended that the Deputy Under Secretary of Defense (Environmental Security):*

*a. Clarify DoD regulations covering direct sales programs and the qualified recycling programs to ensure that expended small arms brass and any other types of AEDA are crushed or shredded and the residue burned (flushed) before the residue is sold, and that all residue from firing ranges is treated as live AEDA until rendered inert and properly certified.*

*b. Develop DoD-wide policies and procedures and implementing regulations governing the reporting, investigation, and coordination of AEDA found in unsecured areas having access to the public. The Deputy Under Secretary should receive and review synopses of the reports semiannually for identification of systemic problems.*

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**Management Response.** The Deputy Under Secretary agreed to clarify DoD regulations covering direct sales programs and QRPs. The recommended action was incorporated in draft DoD Manual 4160.21-M. The Deputy Under Secretary also agreed to develop DoD-wide guidance for reporting AEDA incidents and stated that the reporting, investigation, and coordination of AEDA incidents should follow any DoD-wide policies and procedures established under Recommendation A.1. The projected completion date for Recommendation A.1. was December 1997.

**Evaluation of Management Action.** The Deputy Under Secretary's action to clarify DoD regulations covering direct sales programs and QRPs, even though it does not call for burning the residue, is responsive. However, as of March 31, 2000, the Deputy Under Secretary had not developed standard DoD-wide policies, procedures, and implementing regulations governing the reporting, investigation, and coordination of AEDA found in unsecured areas that the public has access to. The DoD Munitions Residue Disposal Process Review noted in its June 30, 1999, draft report that DLA had a centralized reporting system for AEDA incidents and recommended that:

DoD 4160.21-M require that generators of AEDA provide a report to DLA involving incidents where residue is found to contain AEDA. The data that should be included in the report is provided in DoD 4160.21-M.

DLA should compile and analyze the data and provide the data to the pertinent Military Component for corrective action.

Notwithstanding that the draft report does not mention DoD receiving and analyzing the incident report, the action proposed will meet the intent of our 1997 recommendation when implemented.

*Recommendation C.4. We recommended that the Commander, Fort Lewis, take immediate action to assess the risk of exposure to live AEDA for base recycling center personnel, base residential areas, and the public. As a minimum, procedures that require the certification of range residue as inert before turn-in to the servicing DRMOs, recycling centers, and before permitting the range residue to be taken to the landfill should be implemented.*

**Management Response.** The Army Forces Command directed all its installations, including Fort Lewis, to immediately cease disposal operations and perform risk assessments. The Army Forces Command also directed that operations would not resume until installation commanders were satisfied that operations were in accordance with regulatory requirements.

**Evaluation of Management Action.** Command action was responsive to our 1997 recommendation.

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**Recommendation C.5.** *We recommended that the Deputy Under Secretary of Defense (Logistics) revise DoD Manual 4160.21-M-1, "Defense Demilitarization Manual," to:*

*a. Define all range residue as AEDA until it is rendered inert and properly certified.*

*b. Require that all AEDA residue be assigned a demilitarization code of G to ensure that it is rendered inert and properly certified before turn-in to the DRMO, an ammunition supply point, or a military installation recycling center.*

**Management Response.** The Deputy Under Secretary agreed and stated that policy revisions were already underway for both the disposal and demilitarization manuals. The projected completion date was December 1997.

**Evaluation of Management Action.** As of March 31, 2000, the draft DoD Manual 4160.21-M-1 was not updated to reflect the recommended action. However, the recommended action is no longer compelling because military installations now maintain custody of range residue until it is disposed of.

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## **Appendix E. Report Distribution**

### **Office of the Secretary of Defense**

Under Secretary of Defense for Acquisition, Technology, and Logistics  
Deputy Under Secretary of Defense (Environmental Security)  
Deputy Under Secretary of Defense (Logistics)  
Director, Defense Logistics Studies Information Exchange  
Under Secretary of Defense (Comptroller)  
Deputy Chief Financial Officer  
Deputy Comptroller (Program/Budget)

### **Department of the Army**

Assistant Secretary of the Army (Financial Management and Comptroller)  
Auditor General, Department of the Army  
Commander, Fort Irwin  
Commander, Fort Polk

### **Department of the Navy**

Naval Inspector General  
Auditor General, Department of the Navy  
Commander, Naval Air Warfare Center China Lake  
Commanding Officer, Naval Air Station Fallon  
Commanding General, Marine Corps Air Ground Combat Center  
Commanding Officer, Marine Corps Air Station Yuma

### **Department of the Air Force**

Assistant Secretary of the Air Force (Financial Management and Comptroller)  
Auditor General, Department of the Air Force  
Commander, Eglin Air Force Base  
Commander, Nellis Air Force Base

### **Other Defense Organizations**

Director, Defense Logistics Agency

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## **Non-Defense Federal Organizations**

Office of Management and Budget  
General Accounting Office  
National Security and International Affairs Division  
Technical Information Center

## **Congressional Committees and Subcommittees, Chairman and Ranking Minority Member**

Senate Committee on Appropriations  
Senate Subcommittee on Defense, Committee on Appropriations  
Senate Committee on Armed Services  
Senate Committee on Governmental Affairs  
House Committee on Appropriations  
House Subcommittee on Defense, Committee on Appropriations  
House Committee on Armed Services  
House Committee on Government Reform  
House Subcommittee on Government Management, Information, and Technology,  
Committee on Government Reform  
House Subcommittee on National Security, Veterans Affairs, and International  
Relations, Committee on Government Reform  
House Subcommittee on Technology, Committee on Science

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