



NATIONAL
POLICY
DIALOGUE
ON
MILITARY
MUNITIONS

FINAL REPORT
SEPTEMBER, 2000

APPROVED FOR PUBLIC RELEASE

THE KEYSTONE CENTER is a non-profit organization founded in 1975. Over the past 25 years, the Center's Science and Public Policy Program has become recognized as an international leader in assisting diverse parties to reach consensus on contentious issues. The primary focus of the Science and Public Policy Program is to help solve problems by resolving conflicts and facilitating mutual understanding. Through the use of neutral, professionally managed processes of dialogue, mediation, and negotiation, the Program enables decision makers from government, the environmental community, industry, and citizen organizations to come together to clarify issues in dispute, explore productive ways of addressing them, and develop and document consensus recommendations for creative action.

THE NATIONAL POLICY DIALOGUE ON MILITARY MUNITIONS was convened in January 1997 with the intent of engaging a diverse set of stakeholders on policy-level issues associated with conventional military munitions. The Dialogue met a total of seven times to discuss issues of concern and consider recommendations for improvement. The result of these discussions is this summary report. Issues raised and recommendations put forth were not by consensus, but rather represent an overall synopsis of the discussions.

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CHAPTER 1

Introduction

Background

The National Policy Dialogue on Military Munitions Final Report is the end result of several years of discussions among The Department of Defense (DOD), and its stakeholders about their interests and concerns with the life-cycle of military munitions and military installations, and their effects on communities¹, including those where environmental justice is a concern. The Dialogue participants represent perspectives from both within and outside of DOD, regulating agencies at the federal, state, and tribal level, environmental groups, environmental justice groups and communities affected by munitions and military installations. While these diverse perspectives may have different concerns and opinions about the management of munitions, they share a common concern about the health and safety of their communities. Those who share this concern vary from those who have lived and raised their families in the community for decades to DOD families and employees who live on or near installations. This has been a collaborative effort to holistically describe, quantify, and make recommendations to a complex issue that has to-date only been addressed in a piecemeal and fragmented fashion. However, this Report should not be considered a consensus of the Dialogue members.

The initial stages of the Dialogue primarily sought to exchange information among participants about their interests and viewpoints and improve communication. This Report captures the perspectives of the participants as well as possible ways to improve the munitions life-cycle process and the relationships between DOD and its stakeholders on munitions issues. Further, the intent of this Report is to initiate discussions and actions toward the resolution of the complex munitions and related environmental issues it identifies.

The Department of Defense requires the use of munitions in carrying out its mission. Their design and testing are part of maintaining military readiness, as are training activities that help personnel develop the skills and expertise to use them effectively (see Box 1 for a definition of military munitions). Nonetheless, from product development to use in training and combat, munitions and their constituents pose varying degrees of risk to human health and the environment. Efforts to develop safer and more environmentally sensitive munitions, manage ranges in a sustainable manner, and clean up the impacts of munitions testing and training are all integral to munitions development and use. Such efforts should involve all those affected by these operations. In some cases munitions-associated operations have adversely affected the economic development, human health, and environment of communities

¹Local communities and affected communities are referred to throughout this Report. Local and affected communities include communities adjacent to installations, and communities where an installation's activities has direct environmental or economic effects on a community, including those where environmental justice is a concern.

of color or low-income communities. DOD should make special efforts to share information with these communities, and more effectively involve them in the on-going decisions that affect their lives.

Recent legislative, regulatory and policy actions (e.g., DOD Base Realignment and Closure, Federal Facility Compliance Act, Military Munitions Rule, Proposed Range Rule) have focused regulatory and public attention on the specific environmental and explosives safety risks associated with munitions. DOD and EPA have engaged in a partnering campaign to solicit regulatory and public participation in the policy development process of both the Military Munitions Rule and the Proposed Range Rule that will guide how munitions and ranges are developed, managed and disposed of. DOD and EPA have found the stakeholder involvement through these partnerships extremely valuable in the development of these rules.

Box 1: Definition of Military Munitions

40 CFR 260.10 defines Military Munitions as all ammunition products and components produced or used by or for the U.S. Department of Defense or the U.S. Armed Services for national defense and security, including military munitions under the control of the Department of Defense, the U.S. Coast Guard, the U.S. Department of Energy, and National Guard personnel. The term includes: confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. Military munitions do not include: wholly inert items, improvised explosive devices, and nuclear weapons, devices, and components thereof. However, the term does include non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed.

In 1997, DOD initiated the National Policy Dialogue on Military Munitions to broaden the discussions to all environmental and explosives safety aspects of the life-cycle management of conventional military munitions. This report is a product of the Dialogue, as are the strong working relationships and a better appreciation of different perspectives on behalf of the Dialogue members.

The Dialogue Process

Dialogue members represented diverse perspectives of munitions stakeholders. Representatives from DOD and all of its Services, federal, state and tribal agencies regulating or involved in munitions management, and environmental, community and environmental justice interests participated as members (see Appendix A).

The purpose of the Dialogue was to exchange information among these stakeholders about issues surrounding munitions and their management as well as potential actions to address those issues. This Report summarizes the major issues identified as well as possible solutions supported by some or all of the participants. It does represent some areas of common ground among the members, but participation in the Dialogue does not signify that a member supports everything presented in the Report. This document requests that DOD and other agencies take action.

However, it does not represent a consensus of the Dialogue, and is not binding by law, policy, or regulation.

Overview of the Report

Scope of the Discussions

The scope of the Dialogue focused on conventional munitions. It did not address chemical and nuclear munitions because they both present related but different issues. Chemical weapons are being addressed in other forums such as The National Dialogue on Assembled Chemical Weapons Assessment (ACWA) and the non-stockpile dialogue process.

The Dialogue Group examined the entire “munitions life-cycle” with a particular focus on technology development and stakeholder involvement. The munitions life-cycle includes: research, development, test and evaluation, production, deployment, operations and support, and disposal. For purposes of this Report, munitions life-cycle also includes storage, transportation, training and other munitions uses, demilitarization, resource recovery, treatment, and munitions cleanup and range response.

The presence of unexploded ordnance (UXO) and munitions-related contaminants on current and former military ranges was of particular concern to the Dialogue because they have the potential to impact military readiness and pose environmental and explosives safety risks to communities. In addition, many Dialogue members expressed a concern with open burn and open detonation, one current method of managing UXO.

With regard to ranges, there are regulatory distinctions between active and inactive (A/I), and closed, transferring, or transferred (CTT) military ranges. For these reasons, some sections of this report specify which category of ranges a particular recommendation is intended to address. Because DOD is currently involved in an on-going federal rulemaking process (DOD Range Rule) with regard to CTT ranges, and is restricted from engaging in public comment on topics directly related to the substance of the rule, the Dialogue did not discuss the proposed Range Rule.

The Report begins with overall principles for sustainable range management. Crucial to sustainable range management is better involvement of stakeholders and use of technology. Following the principles is a discussion of how to better involve stakeholders in decisions about munitions development and management, including a section addressing environmental justice concerns, and how to better apply science and technology throughout the munitions life-cycle. The final chapters describe a discussion the Dialogue had regarding future efforts, the actions DOD and the Services have taken to-date based on the discussions of the Dialogue and a summary of their next public involvement steps to address national policy issues.

This Report should not be read as all-inclusive of the many complex and evolving issues of conventional munitions management, but rather as an initial attempt at identifying key questions in need of resolution. It is the expectation of many dialogue participants that follow-on studies, actions, and dialogues will further address these issues in more depth.

Below is a brief summary of the issues each chapter addresses.

CHAPTER 2: Principles for Sustainable Range Use and Management

Recognizing that live firing is essential for munitions testing and training and that ranges are finite resources, the Dialogue members developed a set of principles to help preserve availability of ranges for future military missions by minimizing the adverse explosives safety, health, and environmental consequences of their operations. The principles address explosives safety and toxic and radioactive releases. The Dialogue members hope the principles will enable continued use of ranges for military training and testing operations, assure that these ranges are used in a manner that protects human health and the environment, facilitate the return of obsolete ranges to other uses, and promote DOD actions to protect human health and the environment at former military ranges.

CHAPTER 3: Communication and Stakeholder Involvement in Munitions Decision Making

Stakeholder involvement is a key part of DOD operations when its decisions affect communities, and when its actions may pose risks to human health and the environment. There are many aspects of munitions development and range management that affect adjacent communities and can pose such risks.

In cases where munitions policy and activities have adversely affected a community of color's economic development, environmental quality, or health, processes to involve that community in decisions are particularly important. Because there may be extreme mistrust, cultural and language differences, issues of race, and other barriers to accessing accurate and understandable information in such communities, establishing effective relationships between the installation (and other parts of DOD) and the community will take additional effort, resources, and time. As such, the Dialogue has provided background and goals for addressing environmental justice concerns.

In Chapter 3, Dialogue members provided several examples of principles that can help guide stakeholder involvement processes around munitions policy and activities, as well as several shared issues of concern and potential solutions. This section emphasizes that stakeholder involvement needs to be much more than public relations and outreach; it must involve the public in appropriate advice and decision making.

CHAPTER 4: Technology and Science in Munitions

Many of the factors that concern stakeholders with munitions and their management can be addressed through better application of science and technology throughout the munitions lifecycle. Chapter 4 outlines some possible goals and actions for better application of technology and science in production acquisition, and use, range clearance and range response, and demilitarization. It also addresses the concept of “green munitions” and argues that end-of-life demilitarization challenges must be taken into account early in weapons design.

CHAPTER 5: Issues Needing Further Consideration

Chapter 5 provides a summary of a brainstorming session the Dialogue had at its last meeting. The discussions focused on identifying issues that may require future discussion or evaluation, and suggestions for the composition and structure of future dialogues.

CHAPTER 6: DOD Actions Taken To-Date and Planned Next Steps

Chapter 6 is fundamentally different from the rest of the Chapters because it is not a summary of Dialogue deliberations. Rather, it is written solely by DOD and contains a summary of DOD actions to-date that are responsive to the Dialogue deliberations, the activities DOD plans to undertake in regard to future stakeholder involvement, and the approach DOD will use to review Chapters 1 through 5 and develop an action plan to address issues this report raises.

CHAPTER 2

Principles for Sustainable Range Use and Management

Introduction

The Department of Defense operates military munitions ranges to maintain the high state of operational readiness deemed essential by national security policy-makers for national military strategy. Some ranges are used primarily for training. Others support research and development through test and evaluation. Often military ranges are used for a combination of training, research, development, testing, and evaluation purposes. Today, active military ranges on land cover tens of millions of acres, a fraction of which are designated impact areas; water ranges cover significantly more acres.²

For a variety of reasons, including cost, safety, and other factors, simulators and inert weapons are used in training. But for many purposes, including testing, there is no substitute for live firing. The goal of these principles is to promote the preservation of the availability of ranges for military missions while minimizing the adverse safety, health, and environmental consequences of their operations.

The purposes of the Principles for Sustainable Range Use/Management are: a) to enable continued use of ranges for military training and testing missions; b) to assure that military munitions ranges are used in a way that protects human health and the environment; c) to facilitate the return of ranges to other uses when the military no longer requires their use; and, d) to promote DOD actions to protect human health and the environment at former military ranges where there are known or suspected explosive safety and/or environmental hazards.

Sustainable range use and management may require changes in current practices to use ranges over the long term. These changes should be sensitive to site-specific conditions, such as drought prone areas. Although many of the principles below are either already policy or practice at many military ranges, Dialogue members urge DOD to adopt them as general practice. They should apply to all DOD ranges regardless of who uses them, including foreign governments.

Background

Depending both upon the specific munitions and the conditions under which they are fired or launched, a small percentage of explosive devices, varying by

² In 1995, DOD estimated that they have at least 23 million land acres and 161 million water acres of active and inactive ranges. (Draft Final Report: *Information Related to the Munitions Rule Economic Assessment Collected in Response to a Request from the U.S. EPA*, US DOD, April 1995, page 37)

munition type, fail to detonate as designed. Some of these munitions, known as unexploded ordnance, may detonate if disturbed. These munitions can be difficult to locate when they bury themselves upon impact. In many terrains and vegetative conditions, even surface UXO are difficult to locate. Impact areas and other areas known or suspected of containing UXO are considered a threat to the safety of people who enter such areas, whether authorized or not. Such people include, among others, troops and other employees, hunters, souvenir hunters, metal recyclers, off-road-vehicle drivers, mountain bikers, climbers, hikers, divers and other civilians who may remove UXO from ranges. When this occurs, the explosives safety hazard is transferred to the general public. Because of these issues, range management is an important tool for reducing the risk of encounters with UXO.

Most munitions contain toxic substances. If the munition fails to perform as designed, these substances have the potential to enter the environment through mechanisms such as long-term corrosion of UXO, or low-order detonation, in which the munition partially functions. The explosion and combustion of munitions may also release hazardous by-products into the environment. Although present information indicates the presence of varying degrees of munitions-related toxic substances on ranges, little is known about the long-term fate and transport of hazardous substances on munitions ranges. Efforts are needed to further identify the potential consequences and to develop range management practices that minimize the toxic risks of range operations.

Explosives Safety

- 1. DOD should take actions to ensure that only authorized persons are permitted access to military-owned areas where there are known or suspected explosives safety hazards.**

Munitions ranges, primarily impact areas, typically contain an unknown distribution of surface and subsurface UXO, much of which is difficult to identify as ordnance. People who enter ranges may accidentally or deliberately encounter and disturb such ordnance. Any time a person without appropriate explosives safety training encounters UXO, there is a significant risk of death or serious injury from detonation. Should UXO be illegally removed from a range, the risk is transferred to the public.

DOD should take appropriate action to prevent unauthorized access to DOD ranges, especially impact areas and other areas known or suspected of containing UXO. Such actions include establishing effective access controls (e.g., posting UXO hazard warning and 'do not enter' signs, fencing the area, establishing roving security patrols) and providing public notifications and educational programs regarding potential explosives hazards. DOD should also seek public input on the adequacy of these access controls. They should ensure that those authorized access to DOD ranges are provided appropriate explosives

safety training prior to entering the range and that, when required, are provided escorts.

DOD range policies should address the general safety precautions required to minimize the possibility of accidents during the use of ammunition and explosives by personnel involved in training, target practice, tests or evaluations, and munitions operations, including range clearance operations. Such policies should consider the safety of the general public as well as DOD personnel.

2. DOD should work with property owners and/or tenants, including affected communities, civilian, federal, state, tribal, and local government agencies to take actions to protect the public at former munitions ranges and other areas, including properties adjacent to former ranges with known or suspected military explosive safety hazards.

Many former munitions ranges, and properties adjacent to such former munitions ranges, are now or soon to be owned by private parties and civilian, federal, state and local government agencies and operated for non-military purposes. To date, DOD has identified approximately 1600 formerly used defense sites that are known or suspected to contain unexploded ordnance, require further investigation to determine the potential for UXO, or have already been determined as 'No DOD Action Indicated.' DOD is currently working to quantify the acreage that is potentially contaminated at these sites. A large portion of these sites are currently managed by other federal agencies, such as the Department of the Interior.

Although progress is being made by DOD in clearing these lands, only a small fraction have been cleared sufficiently to be considered generally safe for unrestricted use. Most may still present a significant level of risk to people who use them. Sufficient funding and priority setting criteria should be made available to DOD to assure appropriate response to these lands. These properties should be addressed using appropriate, available technology and processes to ensure protection of the public and, to the extent necessary, to be consistent with the property's use.

DOD should address the explosives safety risks associated with unexploded ordnance on both current and formerly used military installations. In conjunction with non-DOD affected parties, DOD should also establish procedures to ensure that landowners, local officials, appropriate state, federal, and tribal regulators, environmental justice communities, and affected federal agencies (e.g., Department of the Interior, Department of Agriculture, General Services Administration, Department of Commerce) are advised of compatible uses of property located on, or affected by, current or former ranges. The procedures should include a process for determining and communicating any restrictions necessary to protect human health and the environment. Procedures should

also include training regarding steps to follow when UXO is encountered. DOD generally retains liability for preventing UXO encounters, injury, and death at its current and former installations/properties, but at former ranges it can only exercise limited control over the property. Therefore, it is imperative that non-DOD property owners and DOD should work together to minimize potential safety risks and to promote effective environmental response actions where appropriate. For example, restricting access or use of property with fences or land use controls requires that DOD work together with property owners, local government, and tribal or state officials to provide maximum protection while maintaining the value or use of the property.

- 3. As the land available for munitions ranges is finite, military munitions ranges should be designed, constructed, and managed so that the same area can continue to be used for the same purpose. This may involve regular surface or subsurface clearance. Property should not be abandoned because it is contaminated with UXO.**

DOD operates a variety of munitions impact ranges with many different purposes, physical layouts, and operating procedures. The two main uses of ranges are Research, Development, Test, and Evaluation (RDT&E) and training. Without clearance, unexploded ordnance accumulates on such ranges, sometimes impairing their continued use. For example, the presence of surface UXO on aerial practice ranges may endanger aircraft due to ricochet potential and make it difficult to gain access to targets to maintain them. Secondary explosions from UXO on artillery proving ranges make it difficult to evaluate detonations. UXO on live-fire maneuver ranges presents a risk to combat training units.

It is increasingly difficult to obtain approval to establish new munitions ranges. Congress has directed the closure of a number of ranges. Therefore, ranges should be considered a limited resource. Since UXO sometimes accumulates in a manner that prevents ranges from serving their intended function, they must be managed carefully to permit continuing operation.

Each of the Armed Services has policies and practices on active-range UXO clearance designed to permit continued training or testing in the short run, but which do not necessarily consider long-term requirements. The Armed Services should review their long-term range management policies for each type of range, weighing the benefits of surface and subsurface clearance of UXO against the risks, costs, and environmental consequences of UXO detection and removal.

DOD should implement periodic clearance, or if possible, a “clear-as-you-go” policy. Such an approach may serve both to reduce the cost and complexity of any clearance and cleanup required to allow other uses, and ultimately prevent condemning land as a national sacrifice zone.

4. In establishing range management practices for each individual range, DOD should consider potential changes of use.

Historically, millions of acres of former munitions ranges have been transferred from the military to non-federal entities or other federal agencies to be used for other purposes. In addition, DOD has converted many ranges on military installations to uses that are incompatible with that of a range. Regardless of ownership, UXO on former ranges can pose serious risks to the people who use those properties. The cumulative cost of ensuring all such property is clear of UXO is enormous, possibly tens of billions of dollars with current technology.

Although time consuming and costly, DOD should consider in its range management practices, the eventual closure, conversion, or transfer of range property by implementing cost effective, safe practices to minimize the accumulation of UXO and maximize the location and recovery or destruction of UXO. Such practices could save the country significant costs in the long run and increase the flexibility of future use of military property.

5. Use of improved conventional munitions (ICM) should be restricted to sole use target or impact areas, unless necessary to support readiness.

Improved conventional munitions are munitions that contain large numbers of individually armed submunitions. They are designed to disperse their payload (submunitions) at or near impact. A fraction of the munitions' payload typically does not detonate. Therefore, each use can distribute many individual UXO items (submunitions) in the target area. Submunitions are more hazardous and costly to cleanup than weapons that function as one explosive unit. Although the firing of ICMs may be unavoidable in testing, such munitions should not normally be used in training. Where required to be used in training, DOD should consider the use of inert submunitions.

DOD recognizes the safety hazards, difficulty, and potential cleanup costs associated with the cleanup of areas into which submunitions have been fired. To address these concerns, DOD should establish strictly controlled parameters for the use of munitions containing submunitions in other than combat situations. Such policies should minimize their use to include research, development, test, and evaluation required to support national security objectives. DOD should restrict the use of submunitions to specifically designated target or impact areas, and when practical, establish sole use target or impact areas to segregate submunitions from other munitions.

6. DOD should track, permanently record, and preserve records of all munitions fired on each specific range. Previous records for all ranges should be maintained so that data is not lost.

DOD has been using its ranges for many years; however, records as to what activities have taken place on these ranges are limited, non-existent, or were disposed in accordance with directives. Although improvements in recordkeeping have been made in the recent past, DOD still does not use a consistent approach to record what happens on its ranges. The level of recordkeeping varies from pencil and notebook to computer programs developed by individual installations (or off-the-shelf software). Current DOD policy is to permanently track all ammunition expenditures at ranges (see specific listing of what is required to be tracked below). DOD maintains these records for: accountability of weapons and ammunition for national security; accountability to taxpayers for proper use of ammunition purchased; measurement of training effectiveness; and to help determine appropriate range clearance intervals. Maintenance of such records is also important for environmental and explosives safety issues associated with UXO and munitions constituents. To ensure the DOD policy on range records is implemented, DOD should develop readily accessible computer-based systems, internal to DOD, to permanently record this information. Developing a DOD-wide method to track current and future ammunitions use on ranges is crucial to future range use and clearance.

Under DOD policy, the head of each DOD component is responsible for permanently tracking all ammunition expenditures from ranges. (DODD 4715.11-Environmental and Explosives Safety Management on DOD Active and Inactive Ranges within the United States.) That instruction provides a sound basis for developing these DOD-wide methods, which would track:

- ★ All ammunition and explosives expended, to include an estimated dud rate, by type, quantity, location, and the using organization.
- ★ All UXO clearance operations or explosives ordnance disposal (EOD) actions conducted on ranges and their results.
- ★ The coordinates of all areas known or suspected of containing UXO. (Installation master plans or range maps should be used to document such areas.)

7. Firing/dropping and use of explosive material should be timed and targeted to protect sensitive natural and cultural resources.

While meeting military training and testing needs, careful consideration of the timing and targeting of munitions and explosive materiel use, including in some cases spotting charges and other incendiary and pyrotechnic devices, can be effective in preserving sensitive species and protecting natural, cultural, and historic resources.

Military ranges often contain or adjoin areas of sensitive animal populations and plant communities, archeological sites, historic structures and sacred sites. Be it a water range, a land range, or a combination, each range has different unique ecosystems and cultural history. Careful range management and use can meet training and testing needs while preserving ecosystem integrity, biological diversity, archeological, historic and cultural resources.

Training and testing requirements as well as fiscal and time constraints largely drive the military's use of ranges. In determining munitions use activities, DOD should also consider the factors outlined below to promote a long-term and integrated approach to balancing military requirements and natural and cultural resource needs as part of overall range management: (1) the number and type of biologic species likely to be found on the range; (2) the reasons for species decline; (3) reproductive cycles and migration patterns of the species; (4) the extent of remaining natural habitat; (5) climatic conditions; (6) location of cultural, historic sites and other sites; (7) ecosystems and land uses which adjoin ranges; and (8) other factors such as the presence of particularly flammable non-native plant species which may contribute to overall biological species sensitivity.

For example, DOD should minimize munitions use during key phases in the reproductive cycle of sensitive species (e.g., threatened and endangered species). Where flammable plant species (e.g., cheatgrass, red brome) in combination with climatic conditions pose a high probability of munitions-caused fire, DOD should not use incendiary or pyrotechnic devices during known periods of high fire risk. Streams, islands, wetlands and lagoons, and associated bridges, where sensitive species or other valued ecological resources (e.g. spawning trout) are located, should not be used as bombing/shelling targets. Also, efforts should be taken to avoid firing or dropping munitions into surface waters (e.g., estuaries and lakes), if they are not specifically required to meet training or testing objectives.

DOD should work with the local and affected communities to ensure identification of these important resources and the potential impact of firing and dropping munitions.

8. DOD should develop and promote safe and legally compliant methods for recycling metal scrap from ranges.

To maintain some ranges for continued use, DOD conducts periodic range clearance and sweep operations. These operations generate scrap metal and other refuse (e.g., wood from targets, plastic, packaging materials). Scrap metal generated from range clearance operations can contain live munitions items or explosives residue. If this explosives-contaminated scrap leaves the range and DOD control, it poses serious safety risks to the public. As scrap metal is processed for recycling, it is often subjected to heat and pressure, which can cause any munitions items contained within to detonate. DOD should develop

improved methods and technologies for removing the explosives safety hazards from range scrap and for certifying and verifying the hazards have been removed. The scrap metal, once explosives safety hazards have been removed, has a high market value. Under current environmental policies (DODI 4715.4, Pollution Prevention), as much of this metal as possible can and should be recycled instead of being landfilled or left on the range.

9. Munitions used in training and testing operations should have a tracking or identification mechanism (e.g., micro-electrical mechanical device) to enhance the identification and location of UXO.

The current method of locating UXO on ranges includes a combination of physical search methodology and metallurgical identification devices. This requires that the entire landmass of the range be searched. DOD would benefit from initiatives to develop embedded tracking devices to help identify munitions and their locations electronically. One such technology to be pursued in this area is Radio Frequency Identification Devices (RFID) that use radio frequency communications to identify ordnance without direct contact or line of sight between components. RFID systems typically consist of small radio tags, attached to assets that communicate with fixed or mobile readers (interrogators). Such systems allow for hands-off identification/inventory. Additionally, Microelectromechanical system (MEMS) sensors are extremely small, but powerful automatic sensing devices with the capability of recording environmental factors influencing the service life of munitions (e.g. temperature, humidity, shock, and energetic material deterioration.) MEMS sensors could be integrated onto RFID tags and embedded or attached to a munition. Research and Development of the hybrid RFID-MEMS combined technology by DOD could facilitate true life-cycle management of munitions from manufacture to use to final disposition.

Toxic/Radioactive Releases

1. Range operators should regularly report to the public, including environmental justice and locally affected communities, estimated toxic releases in a form that can be compiled and accessed nationally.

Some range activities release toxic substances into the air, land, surface water and groundwater, but little is known about the magnitude of those releases. This information, therefore, should be collected and presented in a systematic way. The neighbors of military impact ranges know little about emissions and discharges caused locally by testing and training. Nationally, the Armed Services, regulatory agencies, and the public have little information about the cumulative toxic releases from munitions testing and training across the country. Using reliable methods such as modeling and monitoring, range operators should

estimate the release of toxic substances from munitions use and range operations, including clearance. Those releases should be reported, for each substance, to each medium (air, land, water). DOD should make special efforts to communicate this information to environmental justice and locally affected communities. Such information can also be used to protect military troops and installation residents.

Such reporting should provide impetus to improved range management and pollution prevention activities, but as with other pollution reduction programs it should be recognized that numerical goals for releases should not supersede military readiness decisions. The information collected and reported in this effort should be used by the military, in cooperation with concerned citizens, to enhance military readiness while reducing avoidable pollution.

2. DOD should respond to releases of toxic and radioactive contaminants on ranges consistent with regulatory requirements applicable to non-range sites.

Toxic or radioactive contaminants on ranges, whether or not they result from military munitions, should be addressed consistent with existing statutes and regulations (e.g., Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response Compensation and Liability Act (CERCLA), National Environmental Policy Act (NEPA), state laws).

3. DOD should address the presence of UXO or other potential explosives safety hazards to allow the characterization of environmental conditions on ranges (e.g., groundwater monitoring, soil or sediment sampling, air emission monitoring). However, it is recognized that explosives safety concerns may need to be addressed prior to such characterization.

Detailed environmental information for ranges is often limited, including the understanding of potential environmental risks posed by ordnance and other constituents on a range. Environmental sampling and evaluations are key to understanding these risks. An assessment of the environmental conditions may require installing monitoring wells and subsurface borings. The wells and borings help determine the presence and/or extent of ordnance constituents in subsurface soil and groundwater within or near an impact area.

When evaluating the siting of monitoring wells and/or soil borings within these controlled areas, range records, regional hydrogeological information, and site-specific safety and operational parameters must be evaluated. This information then is taken into consideration to help plan an assessment of the environmental conditions at the range.

The installation of monitoring wells or borings at a range will often require UXO clearance in selected areas, before initiating any on-site assessment work. The clearance activity itself, when properly planned, executed, and recorded, can provide additional and valuable information regarding the surface distribution of UXO.

- 4. DOD and appropriate regulatory agencies should monitor emissions from range fires and prescribed burns and analyze them for potential risks to human health. DOD should explain all proposals for prescribed burns to the public, including environmental justice and locally affected communities, and along with appropriate regulatory agencies, should evaluate those proposals based upon public feedback.**

Range fires, whether accidental or prescribed, release toxic emissions from explosive waste, other chemicals found on ranges, and the vegetation itself. These emissions, even some which are not regulated as "toxic" substances, may cause both acute and chronic health problems. Because range fires can easily be seen (as well as tasted and smelled) by people off-range, it is important for the military and appropriate regulatory agencies to communicate frequently with the affected public, including environmental justice and locally affected communities, as well as state and local agencies.

Weapons detonation or deflagration sometimes ignites accidental range fires. Each base should have a clear plan, developed in consultation with local emergency management agencies, describing if and how it plans to respond to accidental range fires.

In addition, the Armed Services and their contractors often use prescribed burns to prepare munitions ranges for the clearance of unexploded ordnance or to otherwise support range management. Though such fires sometimes detonate ordnance, fires are not an effective or reliable way to eliminate explosive hazards, and they are not used as such by the military.

Prescribed burns are subject to review by a variety of agencies. Such agencies may require permits for prescribed burns, or they may simply regulate the timing and procedures. In advance of any prescribed burn, the military should explain to the public at large, including environmental justice and locally affected communities, why the burns are proposed and what procedures are being utilized. Public concerns should be addressed before any decision to move ahead with a burn. Where requested by concerned members of the public, including environmental justice and locally affected communities or regulators, the military and other agencies should be prepared to monitor air quality downwind to determine the nature and extent of potentially health-impacting emissions.

5. Depleted uranium weapons should not be fired into the same area as explosive ordnance.

Depleted uranium (DU) weapons are conventional projectiles that contain non-fissionable and non-explosive uranium. They are designed to penetrate hard targets upon impact. Depleted uranium is also pyrophoric (i.e., it ignites spontaneously) when converted into a finely divided metal powder, ultimately forming uranium oxide dust. To a limited extent, this occurs to the outer layer of a DU round upon impact with a hard target. As a heavy metal, DU potentially poses a toxic hazard. It also poses a low-level radioactive hazard. Ranges where DU weapons are to be or have been fired are regulated by the Nuclear Regulatory Commission, which requires decontamination and decommissioning (D&D) activities once it has been determined that the area will no longer be used as a range. In addition, CERCLA authorities apply to DU cleanup because DU, as a radionuclide, is a listed CERCLA hazardous substance in 40 CFR, 302.4. The Armed Services have at times fired DU projectiles into impact areas also used for other conventional munitions that contain high explosives. The high explosive rounds that do not detonate remain on the range as UXO. The presence of UXO in such DU firing areas increases the complexity and hazard associated with DOD activities.

DOD recognizes the unique hazards, and risks associated with the clearing of areas in which munitions containing depleted uranium are used. It also recognizes that the use of munitions containing DU may create unique toxicological and radiological concerns generally not associated with other weapon systems. Members of the Dialogue suggest that these concerns need to be communicated to the public, including environmental justice and locally affected communities. DOD should consider conducting human health risk assessments on affected communities including where environmental justice is a concern.

To address these concerns, DOD should continue to strictly enforce control parameters for the use of munitions containing depleted uranium in other than combat situations and institute policies that minimize the generation of explosives/DU mixed waste. Such policies should minimize DOD range use of munitions that contain depleted uranium to activities that are required to support national security objectives. These policies should apply broadly to range use including that for research, development, test, and evaluation. DOD should continue to restrict the use of munitions containing depleted uranium to specifically designated Nuclear Regulatory Commission-licensed target or impact areas. When possible, depleted uranium should only be fired into containment fixtures, and high explosives munitions should not be fired into the same area as DU. When practical, DOD should establish sole use target or impact areas to segregate munitions containing depleted uranium from other munitions.

6. Small arms ranges should be designed and operated to promote recovery and recycling of spent bullets.

Military small arms ammunition (.22 caliber- .50 caliber) is used for both training and testing purposes. The projectile portion, or “bullet,” typically contains at least one of several metallic materials (most notably lead). During most training and/or testing operations these bullets are fired at stationary targets. Over time, the bullets accumulate in the area around the targets. Depending on site-specific conditions, the bullets may degrade (through fragmentation and oxidation), and become concentrated in the topsoil layer and the base of the backstop. If certain specific conditions exist, such as soil erosion, the metals may move or spread away from the target area in soil or surface water.

The target areas can, depending on mission requirements, be designed in such a manner as to: a) facilitate the recovery and recycling of the bullets and their metal constituents and, b) minimize the potential for movement or spreading of the metals through environmental media including soil, water, and air. Examples of range management practices include actions such as installing equipment to facilitate the collection and recycling of bullets, controlling the pH of the soil on the range and controlling water runoff. Implementing these designs may reduce the costs and simplify the procedures required for sustainable range management. Therefore, efforts should be made to acquire and implement these designs expeditiously.

7. Targets should not contain hazardous substances and, if it is not possible to avoid their use, they should be designed and maintained to prevent release of hazardous material or toxic chemicals.

Various targets have been placed on the impact areas with items such as full gas tanks or transmission oil pans. Some have even contained items such as radium dials. When the targets are fired upon, these materials may be released into the environment. To minimize environmental contamination, all targets should be emptied of hazardous materials and have any components containing hazardous materials removed prior to being placed on the range. If this is not possible for a given target, then a substitute target should be sought out and used.

8. DOD should actively continue to develop and use more environmentally friendly munitions for training and testing operations.

Training and testing operations using munitions will impact the environment at the time of use (blast impacts, noise, heat, etc.). In some situations, these impacts are short term in nature and natural ecological succession will repair the damaged landscape. In other situations, the impacts are long term and take decades to repair. Residual material, or “residues,” from the use and functioning of munitions may accumulate at military ranges. These residues are typically residual

energetics, organic combustion products, or the metal from the munitions. Munitions which result in less toxic residues will make sustainable range management less costly and more easily attainable.

Accumulations of lead at small arms ranges were identified as a concern. DOD is now developing “Green” or lead-free ammunition for small caliber weapons. (For additional information on “Green” Programs, refer to boxes 3 through 7 in Chapter 4.) These munitions replace the lead in the projectiles with less toxic materials. The residues from their use are designed to be significantly less toxic and will eliminate the accumulation of residual lead. The lead free bullets are designed to provide no change in combat performance and one type only costs 3 to 5 percent more to purchase than leaded ammunition. DOD should strive to similarly modify other munitions that are identified as having highly toxic residues. In addition, DOD should continue to develop inert munitions and simulators when such substitutes can provide an acceptable alternative to training with live munitions.

9. DOD and other parties should work cooperatively to continue to develop the knowledge base on the impacts to human health and the environment from the use of munitions on ranges.

Currently, the information necessary to assess accurately the environmental impacts, including potential threats to human health, resulting from range activities is either not available or known. Limited data on emissions and residues from munitions training and testing activities has been gathered at a few ranges around the country, but this data is not conclusive. DOD should continue to work with stakeholders to develop a plan to assess the fate and transport of emissions and residues resulting from munitions used on ranges. The toxicology of the munitions constituents should also be assessed and potential receptors identified. The data will enable DOD, along with other stakeholders, to better understand and manage the risks and long term impacts from munitions use, thereby allowing DOD to better manage its ranges for sustainability. Better management of ranges would also support readiness by ensuring continued access to these areas for testing and training.

CHAPTER 3

Communication and Stakeholder Involvement in Munitions Decision Making

Introduction

Communications and stakeholder involvement are an important part of community relationships for many installation and DOD activities and decisions. Stakeholder involvement efforts range from involving federal, state, tribal and local regulators in munitions decisions, to engaging locally affected communities. The management and use of munitions can have effects on human health and the environment in adjacent communities, limit future land use in range areas, and raise environmental justice concerns. Therefore, the involvement of these communities and others who do not have a formal role in munitions decision-making is the focus of this chapter.

With respect to the primary issues of concern in this Report—sustainable range use management, and munitions technology—there are specific actions DOD and its stakeholders may take to improve communication and stakeholder relationships. These steps include building trust between stakeholders and DOD personnel, addressing concerns at the appropriate national and installation levels, addressing concerns of environmental justice, working with affected communities and other stakeholders to identify appropriate future land uses and access/use controls, and seeking resources to improve both DOD’s and stakeholders’ capacity to participate in collaborative discussions, processes, and decisions.

This chapter provides some background on why stakeholder involvement and addressing environmental justice concerns is important, basic principles for involving stakeholders in decision-making processes, and a summary of issues and possible solutions associated with stakeholder involvement in munitions activities and decisions.

Background on Communications and Stakeholder Involvement

First and foremost, when discussing stakeholder involvement efforts, it is important to know whom you are including in the definition of stakeholder. The Federal Facilities Environmental Restoration Dialogue Committee (FFERDC) (see box 2), defined “stakeholders” as “...those affected by or who otherwise have an interest or “stake” in, or the ability to influence, the outcome of [an action].” This includes internal DOD stakeholders, and federal, state, tribal and local regulators. However, the FFERDC Report goes on to say that stakeholder involvement efforts need to include public stakeholders that do not have a formal decision-making role, as DOD stakeholders and regulating agencies do. These stakeholders in munitions issues include people from the affected communities,

current or future land owners, local and national activist groups, affected community organizations and local land reuse organizations, the media, contractors, and others interested in how munitions are manufactured, tested, handled, used, cleaned up and disposed. Several members of the Dialogue pointed out that DOD families and employees are often stakeholders in that they live on or near military installations, and share many of the same concerns as public stakeholders.

In some cases, effective stakeholder involvement is not occurring because agency personnel and stakeholders alike do not see the value in investing time and energy into such processes. Nonetheless, experience demonstrates that involving communities early and regularly in the decision-making process enables public stakeholders to help agencies make cost-effective and more supportable decisions. Through the Dialogue process, the following specific reasons were shared as to why stakeholder involvement is important and valuable to the military and the community alike.

“It’s the right thing to do”

A whole body of laws requires that stakeholder involvement be undertaken. Further, working together has many benefits besides the specific project at hand. Stakeholders learn about the overall demands and needs of the military as they pursue their mission while the military learns about the citizens’ broader needs and concerns.

Box 1: IAP2 Principles for Public Involvement

- 1. Stakeholders should have a say in decisions about actions that affect their lives.** Citizens have the right to meaningful participation in discussions related to the effects that governmental decisions may have on them, their families, and their livelihood. Governmental agencies have missions to accomplish. All stakeholders must be involved at the very outset in identifying issues and solutions.
- 2. Stakeholder contributions should influence decision making.** Public input is a valuable component in the decision-making process, providing additional, community-based information to the decision maker. Decision makers need to ensure that the public can clearly see where and how their input is used in making decisions.
- 3. Stakeholders should be involved in defining how they participate.** Stakeholders have varying needs for participation. All stakeholders should be involved in developing the methods and forums by which they will participate in the process.
- 4. The process by which they will be involved should be communicated to stakeholders, and stakeholder process needs should be met.** A stakeholder involvement plan should be developed, in consultation with interested stakeholders. Once the plan is formulated, it should be widely disseminated and followed.
- 5. The stakeholder involvement process should actively seek out and facilitate the involvement of those potentially affected.** Each community is different. Each has its own culture, norms and values. When developing the comprehensive plan for involving stakeholders in discussions and dialogue, a thorough analysis of all aspects of the community are required in order to ensure diverse participation and outreach.
- 6. Where national security is not an issue, all stakeholders should be involved in defining issues and provided opportunities for discussion, dialogue and debate toward mutually acceptable solutions.** In order to have meaningful involvement in the decision-making process, all stakeholders need to be involved early and often, working collaboratively to identify problems, define issues, and work toward mutually acceptable solutions. Bringing some stakeholders into the process in the middle or at the end of the decision cycle (as some laws suggest), reduces the chance of meaningful involvement.
- 7. Stakeholders should be provided the information they need to participate in a meaningful way.** Agencies need to ensure that all relevant information is provided in a timely and understandable manner to all stakeholders in order for them to provide meaningful input to the decision-making process.
- 8. Stakeholders should be told how their input affected the decision.** In order to ensure that all stakeholders know if and how their input influenced decisions, decision makers need to ensure that the decision-making process is open, transparent and responsive. As input affects decisions, the decision maker needs to let everyone know where input is incorporated. If input is considered and not used, the decision maker needs to ensure that all stakeholders know why.

“It’s the smart thing to do”

The community has a wealth of knowledge and experience that the commander and installation can use to make a more informed decision. It’s a win-win situation if the commander can tap the resources of the community and include them in the process. Similarly, from the community perspective, having a positive, working relationship with an installation is less taxing on all involved. Having a positive relationship on munitions and related efforts builds an on-going relationship that will influence how the community and the installation interact in other areas.

“It’s the fiscally responsible thing to do”

Delays on projects often occur when public concerns have not been considered early in the process. Such delays increase the cost of doing a project, thus, reducing the funds available for other restoration efforts. Working positively together on a project allows for the most prudent expenditure of limited funds.

Box 2: Federal Facilities Environmental Restoration Dialogue Committee Final Report

In 1996, a Dialogue Committee comprised of a diverse representation of stakeholders in federal facilities cleanups issued recommendations regarding stakeholder involvement at federal facilities. This report provided a starting point for the Munitions Dialogue. The report and the status of its recommendations can be found at: <http://www.epa.gov/swerffrr/partner.htm>

Principles for Stakeholder Involvement

Throughout the course of the Munitions Dialogue, participants wanted to build on existing efforts to improve communications and stakeholder involvement. As such, two documents proved to be particularly informative when discussing stakeholder involvement in munitions and range management. These include the International Association for Public Participation (IAP2) principles for public involvement, and the Federal Facilities Environmental Restoration Dialogue Committee Final Report. Each of these resources is explained in more detail in boxes 1 and 2.

Beyond these Principles, the Dialogue discussed issues of particular concern regarding stakeholder involvement in munitions management. The Dialogue developed six basic principles or steps to assist stakeholder involvement efforts in munitions management. Referred to as the “6 I’s.” they include:

- ★ Identify potential stakeholders
- ★ Invite stakeholders to participate
- ★ Inform stakeholders of potential actions and decisions
- ★ Involve stakeholder input in decision making
- ★ Incorporate stakeholder concerns in decision making
- ★ Implement decisions that incorporate stakeholder concerns

These principles are described in more detail in Box 3.

Dialogue members identified the following “groundrules” that are helpful for all parties to follow in building trust and accountability:

- ★ All stakeholders should come to the process with an open mind and willingness to listen to one another;
- ★ All stakeholders must respect one another and the diverse viewpoints others bring to the process; and
- ★ All stakeholders should be accountable for their actions.

Further, stakeholder involvement processes will assist in building trust and accountability if they follow these basic principles:

- ★ Provide for transparent and open communication;
- ★ Encourage inclusion of diverse perspectives;
- ★ Emphasize interaction and responsiveness among participants and decision makers; and
- ★ Respect the law and individual rights.

All communities near munitions operations are potentially adversely affected by the installation, and would benefit from better and more widespread application of the above principles and ground rules. When munitions activities affect communities of color and low-income communities there may be additional environmental justice concerns that add to the mistrust between the community and the installation. Additionally, those communities’ access to resources to participate in stakeholder involvement processes may be limited. These factors can make applying the principles and ground rules more complex and challenging. As such, the section

Box 3: The Six I’s

Identify potential stakeholders and their needs: DOD field staff should actively seek out and solicit the full diversity of public stakeholders in communities. Prior to initiating stakeholder involvement programs, field staff should conduct assessments of existing needs and resources within stakeholder communities to be able to better reach and meaningfully involve them in decision-making processes.

Invite stakeholders to participate: Outreach to invite stakeholders to participate should build on existing community resources and organizations. For example, postings and announcements at other community activities and organizations will reach people involved in their communities. If it seems that the “public isn’t interested,” it is likely because they haven’t been informed adequately about the opportunity to participate. Also, because there may significant mistrust of DOD activities, several attempts at inviting participation may be needed to build the trust necessary for the public to attend.

Inform stakeholders of potential actions and decisions: To help build trust and open communication, field staff should inform stakeholders of their potential actions and decisions and opportunities to participate. Information should be presented in an understandable manner to the public and be disseminated in an accessible manner.

Involve stakeholder input in decision-making: Stakeholder involvement efforts should work to develop partnerships between DOD and its stakeholders. Simply briefing the public on decisions being made does not constitute a stakeholder involvement program. Involvement allows stakeholders to become more informed about DOD’s actions and issues, and DOD to become more educated about communities’ and other stakeholders’ concerns and interests. As such, common goals can be identified.

Incorporate stakeholder concerns: As trust and understanding between DOD and stakeholders builds, field staff should be able to better incorporate stakeholder concerns in their decision-making. Field staff should inform stakeholders how their concerns were incorporated, and when concerns cannot be fully addressed and why.

Implement decisions that incorporate stakeholder concerns: Follow through can be the most important part of a stakeholder involvement process. If decisions that incorporate stakeholder concerns are never implemented, stakeholders may begin to question the value of their participation, and lose trust for the field staff.

below better defines environmental justice concerns with munitions activities, and suggests some possible goals and actions for addressing those concerns.

Addressing Environmental Justice Concerns in Stakeholder Involvement Activities

In cases where munitions activities have had a disproportionate effect on communities of color, such as African-American, indigenous, Asian-American, and Latino and low-income communities, special efforts are often needed to involve these communities in the decision-making process. Issues of race, communication and access to resources may come into play in different ways than in other communities near munitions installations. Some environmental justice advocates note that the effects on their communities are both environmental and economic, in many cases affecting the health and economic wellbeing of these communities. While these effects are not unique to communities where environmental justice is a concern, they can breed additional mistrust, and contribute to other outside factors affecting these communities.

The National Environmental Justice Advisory Council defined environmental justice as “The fair treatment and meaningful involvement of all people, regardless of race, ethnicity, culture, incomes and educational level with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no population, due to political or economic disempowerment, is forced to shoulder the negative human health and environmental effects of pollution or other environmental hazards.”

In some cases, environmental justice advocates believe that the Department of Defense has not been accountable to communities for disproportionate impacts, or complied adequately with environmental laws such as cleanup levels and reuse and redevelopment decisions.

These circumstances have resulted in an additional lack of trust and the impacts on these communities need to be addressed. While many of the principles and goals

Box 4: DOD’s Environmental Justice Public Participation Checklist

Appendix B is a checklist prepared by DOD to assist its personnel in complying with the Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. (See Box 5 for more information on the Executive Order.) This checklist is included for informational purposes. The checklist provides guidance on a variety of issues including setting up public meetings, who to include, processes to use to ascertain interests, and approaches to ensure cultural sensitivity. DOD has also prepared a strategy for implementing the Executive Order.

Box 5: Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*

EO 12898 directs federal agencies to develop environmental justice strategies that identify and address disproportionately high exposure and adverse human health or environmental effects of their programs, policies and activities on communities of color and low-income populations. Strategies must consider enforcement of statutes, in areas with minority and low-income populations, greater public participation, improvement of research, and identification of differential patterns of subsistence use of natural resources. The Executive Order can be found at the following web site:
<http://www.denix.osd.mil/denix/Public/Legislation/legislation.html>

below apply to stakeholder involvement generally, there are additional specific recommendations to help address environmental justice concerns and issues.

Environmental Justice Principles

Where munitions operations have had adverse impacts on communities that have historically lacked economic and political power, adequate health services, and other resources, environmental justice concerns arise. Members of these communities cannot always participate effectively in traditional public involvement activities because, in some cases, they do not possess access to the resources or technical and analytical

expertise to do so. This lack of involvement can breed mistrust that is also infused into cultural differences, making effective communication between the military and the community even more difficult. In these cases DOD, the affected community, and other stakeholders need to work together to provide the information and capacity to identify the full range of concerns regarding past and present munitions, future land use at the site, and develop strategies for sharing information effectively.

Further, many environmental justice advocates stress that these communities, often located adjacent to ranges and bases, need to be directly involved in developing economic development and reuse strategies that will strengthen and help build on the inherent cultural and historical strengths of impacted populations. Because environmental justice concerns involve communities of color with strong ties to their cultural heritage, or low-income communities, the opportunities to address community concerns through redevelopment are heightened. Box 6 contains information regarding a resolution presented to Defense Environmental Response Task Force that describes several environmental justice principles and concerns. The entire resolution is included in Appendix C.

These principles of trust, accountability and environmental justice are discussed in greater detail in the issues and possible solutions below. Boxes 7 and 8 also provide information on some resources and tools available to assist stakeholders in munitions decision making.

Box 6: Revised Actions for Environmental Justice

A Resolution Presented to DERTF by LeVonne Stone, Director, Fort Ord Environmental Justice Network

Many environmental justice concerns continue to be discussed in forums on how to better involve stakeholders in DOD decision making. In April 1999, The Fort Ord Environmental Justice Network presented their concerns and resolutions for addressing environmental justice to the Defense Environmental Response Task Force. An updated version of that resolution is included for informational purposes in this report in Appendix C.

Goals to Address Environmental Justice Concerns

Goal 1:

Stakeholder involvement efforts reflect the diversity of the affected communities.

The membership of entities such as RABs, other citizen advisory boards and stakeholder involvement efforts need to adequately reflect the diversity of the affected communities. While managing diverse perspectives can be difficult, involving all those affected by decisions will improve stakeholder relationships and build a better understanding among DOD personnel and stakeholders alike about the challenges they face.

Possible Actions: DOD and the Services can make efforts to better enforce existing guidance that stresses the importance of reaching out to all perspectives, and possibly issue additional guidance to ensure that diverse perspectives are represented in stakeholder processes.

Goal 2:

Public stakeholders, including communities of color, indigenous peoples, and low-income communities have adequate capacity to participate in munitions decision-making processes.

Munitions-related operations and decisions can be very technical in nature as can cleanup levels and remedies. Many public stakeholders have developed the technical expertise needed to evaluate proposed actions. In the instances where community members lack this expertise their ability to participate effectively is limited. In these instances, it is important for the public to have access to resources to obtain trusted translators of technical information. Box 8 provides information on some existing resources to help build technical capacity.

Possible Actions: Where there is a need, DOD should assist these communities in developing the technical and analytical expertise needed to be effective participants. This may include, among other activities: supporting or developing training and technical assistance programs; involving historically black and Hispanic colleges and universities, tribal colleges, and other special emphasis educational institutions in range management research; and supporting national and regional forums for representatives of such communities to share ideas and approaches for involvement in decision-making processes.

In addition, supporting the establishment of partnerships among environmental justice activists at the national level can help these activists build capacity to more effectively participate in both local and national policy decisions. This network could also help identify resources for technical assistance, and leverage those resources by allowing activists to share experiences and information.

While the ability of DOD to take full responsibility for capacity building initiatives is limited by funding authorizations, DOD can leverage activities of other federal, state and local agencies and organizations through support and assistance, providing value to all parties.

Goal 3:

Stakeholder involvement efforts for munitions decisions respect and value the cultural differences that exist within the affected communities.

Individuals use different styles of communication, often influenced by their culture and heritage. For example, providing written comments or standing up in front of a large group at a public meeting may be difficult for community members. A lack of understanding and acceptance of alternative communication styles has resulted in government personnel and others often ignoring the input being provided. Without a recognition and respect for different styles of communication, there is not a trusted forum for providing advice and significant exchange and learning cannot take place.

Possible Actions: Dialogue members offered that DOD personnel should be provided with training in alternative communication styles and cultural sensitivity so they can more easily respond to messages delivered in alternative manners.

Goals for Stakeholder Involvement in Munitions Decision Making

To more broadly address the concerns of all communities and stakeholders affected by munitions activities, Dialogue members began their discussions about how stakeholder involvement on munitions might be improved from the national policy level. As discussions continued, Dialogue members shared that many challenges also remain at the installation level, particularly when national policy intended to address stakeholder involvement issues is not implemented at the local level. Further, in many cases, community-specific concerns cannot be anticipated or addressed through national policy guidance. Therefore, improvements are needed both at the national and local level.

Through the Dialogue process, members were able to identify several shared issues of concern, as well as discuss possible solutions. The goals below address concerns at both the national and local level, and very often resolution to these issues will require coordination between the two. Many of the issues the goals address are based on Dialogue members' experience with stakeholder involvement processes for munitions-related decisions. Each goal is briefly discussed, and then followed by possible actions. The order of the goals does not indicate any prioritization, but are organized around these common themes:

- ★ Building trust;
- ★ Skills and expertise;
- ★ Follow through with national policies;
- ★ Responsiveness to local differences; and

- ★ Economic opportunities and land use.

BUILDING TRUST

Goal 1:

Trusting productive relationships between installations and affected communities increase.

Trust is an essential factor in establishing working relationships between community members and DOD personnel. When trust exists, community members are more likely to understand and even accept decisions that may go against their desires. When it does not exist, community members often view all decisions and actions with suspicion. Related concepts that influence trust in decision-making processes are two-way communications or dialogue, access to documents, inclusion, accountability, integrity, respect, follow-through, good faith effort, and sincerity.

To build trust, DOD personnel must not only agree to take certain actions but also follow through on implementing them and communicating the results within reasonable time frames. Beyond that, a military or community entity must be willing to accept, acknowledge, and apologize for promises that were never carried out, mistakes made, or indiscretions that have been brought to light. It can be difficult to build trust and show commitment without demonstrating the integrity and honesty such codes of conduct require.

Numerous examples were brought to the Dialogue where trust had been harmed by the lack of openness and responsiveness of installation personnel or the establishment of processes that are not “user friendly.” Similarly, several examples were provided where community members had not shown a willingness to listen, thus, supporting the opinion of some in the military that public participation does not result in better relationships and decisions.

Possible Actions: One particularly effective method of involvement is to establish advisory boards at the community level for the purpose of actively educating and engaging a diverse set of stakeholders in the implementation of munitions management policy. Such advisory boards can play a unique role in an overall community involvement process. Through these boards, community members and agency representatives are asked to commit to open and regular dialogue and work together to find ways of effectively managing munitions in a manner that responds to community concerns. Dialogue members recognize that DOD has established a number of Restoration Advisory Boards (RABs) as recommended by the FFERDC. RABs or other citizen advisory boards already established in areas where munitions are an issue, should be utilized as a tool for discussion and involvement in munitions-related decision making. Where it is difficult to expand the scope of an existing board, the installation should consider

the establishment of an advisory group or subcommittee focused on munitions-related issues. The Dialogue members caution, that although RABs and other boards established for stakeholder involvement in munitions-related decision making play an important role in the stakeholder involvement process, such boards are only one component of the stakeholder involvement process and should be used to complement, not replace, other involvement activities discussed in this chapter.

Goal 2:

Stakeholder involvement efforts are open to honest feedback from stakeholders and allow for problem identification without retaliation.

During their discussions, Dialogue members recounted instances where individuals who had raised issues about activities at an installation had encountered hostility or retaliation from installation personnel. Providing information to stakeholders about munitions operations may allow them to identify unforeseen problems as well as solutions. DOD and the Services must be open to hearing problems stakeholders raise. Solutions DOD considers should address the problem at hand rather than the person who raised it.

Possible Actions: Community members and the installation should establish agreed-upon groundrules that foster open and

Box 7: Tools and Resources for Stakeholder Involvement

Defense Environmental Restoration Program Annual Report to Congress for Fiscal Year, (Done for each Fiscal Year) Contains an overall analysis of the Program as well as site specific listing of efforts.

"Ordnance and Explosives Environment." ACOE, Huntsville, A quarterly newsletter. For more information, contact Kim C. Gillespie at kimberley.c.gillespie@usace.army.mil

The Model Plan for Public Participation, Developed by the Public Participation and Accountability Subcommittee of the National Environmental Justice Advisory Council, US EPA November 1996 EPA 300-K-96-003

Web Sites:

<http://fr.cos.com/>
This Federal Register site lists federal agency announcements and information.

<http://www.CPEO.org>
The Center for Public Environmental Oversight's web page has an active list serve on munitions and other related issues. The list serve is archived and searchable by topic.

<http://www.rama-usa.org/index.htm>
The Rural Alliance for Military Accountability (RAMA) web site has information on efforts associated with various installations in Nevada and links to other sites.

<http://www.denix.osd.mil>
The Defense Environmental Network and Information Exchange web site is used by DOD and Service personnel but has a public menu. It is a good location to find copies of items such as DOD directives.

<http://www.sierraclub.org>
Sierra Club's web site has a variety of sites and list serves that can provide information on assorted issues.

<http://www.epa.gov/swerffrr>
This EPA web site provides information on EPA's Federal Facilities cleanup and oversight programs.

<http://es.epa.gov/oeca/main/ej/index.html>
This EPA web site has a link to the National Environmental Justice Advisory Council (NEJAC) web page.

honest exchanges of information and help reduce the tension between identifying problems and working towards their solutions.

SKILLS AND EXPERTISE

Goal 3:

DOD and Service personnel possess the necessary skills and expertise to ensure effective stakeholder involvement.

Some of the problems encountered between installations and communities were attributed to the lack of appropriate expertise within DOD for working with stakeholders. It was suggested that DOD personnel responsible for stakeholder involvement should have the following kinds of abilities:

- ★ Effectively identify stakeholders and recognize their interests and concerns;
- ★ Adequately analyze the impact of diverse viewpoints on the mission;
- ★ Develop strategic plans for involving diverse stakeholders early and regularly, be able to integrate public stakeholder advice into the decision-making process; and
- ★ Communicate and facilitate resolution of cross-cutting and complex issues, and provide team building, conflict management, facilitation, and consensus-building support on munitions issues.

Possible Actions: Efforts should be made to hire personnel with this unique combination of skills and to train existing personnel. It was suggested that job performance evaluations should specifically include stakeholder involvement skills.

EFFECTIVE IMPLEMENTATION OF NATIONAL POLICIES

Goal 4:

National policies are implemented effectively at the regional and local levels.

Dialogue members began their discussions pointing to the problem of policies being issued at the national level but not being followed at the local, regional, or national level. Uneven implementation is particularly frustrating to stakeholders.

Possible Actions: Every effort must be made to ensure that national policies are implemented at the local, regional, and national levels, and avenues of redress should be established. During the Dialogue, it was suggested that the

Box 8: Technical Assistance Resources

DOD and EPA have several programs that provide technical assistance to communities near Superfund and other hazardous waste sites. DOD's *Technical Assistance for Public Participation (TAPP)* Program provides RABs and TRCs with funding for technical assistance. For more information, see their web page: <http://www.dtic.mil/envirodod/rab/resource.html>

EPA has several programs that may apply to communities near munitions ranges. For more information see the following web page: <http://www.epa.gov/oerrpage/superfund/tools/>

creation of a national munitions advisory board, composed of diverse representatives, could elevate the problems associated with the transfer of policy from the national to local and regional levels. It could also provide a sounding board for policy level issues. DOD should work with its stakeholders to develop lists of reference contacts and phone numbers at both the local and national level to help stakeholders identify personnel who can assist them in addressing concerns and problems. Many Dialogue members recommend that these contacts include not only military personnel, but also community leaders and organizations. These lists should be made widely available and accessible to affected communities and other interested stakeholders.

RESPONSIVENESS TO LOCAL DIFFERENCES

Goal 5:

Stakeholder involvement efforts for munitions decisions are sensitive to local differences.

In some cases, DOD and Service efforts have pursued stakeholder involvement generically, in a manner that is not responsive to local needs. Locally spoken languages, resources, and time available to participate are not always taken into account. When efforts to reach a community do not take these factors into consideration, there is a perception that there is no local interest.

Possible Actions: One-size-fits-all approaches to stakeholder involvement have limited success. All public stakeholder communities are different, and there is no one, single implementation program appropriate for all communities, including communities of color, indigenous peoples, and low-income communities. Any guidance must stress the importance of field staff learning about and understanding the specific community at hand.

For example, communities have different requirements for notification and involvement. Their unique requirements must be honored to ensure involvement, for example:

- ★ evening meetings for working citizens;
- ★ notices posted where people go: church bulletins, school newsletters, grocery store bulletin boards;
- ★ multiple notices and reminders; and
- ★ multilingual translations.

Goal 6:

Stakeholder involvement efforts for munitions decisions more effectively seek out local interests.

Several times throughout the Dialogue, military representatives recounted their problems in doing adequate stakeholder involvement because they were unable to identify individuals in the affected community who are interested in

participating in efforts such as RABs and other citizen advisory boards. Some saw this as a signal of an inadequate outreach program that needs to be re-evaluated.

Possible Actions: In addition to re-evaluating the outreach program, the means used to communicate information can be important in reaching those with an interest in participating. Potential approaches that might be used include:

- ★ Utilizing local media outlets such as local cable TV access and government channels, newspapers, and local Internet service providers to get citizens informed and involved;
- ★ Ensuring materials for stakeholder involvement are culturally sensitive and relevant to the specific area, including providing information in appropriate languages and at a variety of scientific levels;
- ★ Using local government and other institutional stakeholder involvement mechanisms (i.e., zoning meetings, environmental boards, human health departments, and citizen advisory boards and local re-use authorities) for information exchange regarding cleanup activities. Local governments can establish and maintain information repositories that make documents available to the public at the same time they are made available to regulators; and
- ★ Designating locations for access to information that are appropriate and convenient for the affected communities, and making copies available for public stakeholders.

ECONOMIC OPPORTUNITIES AND LAND USE

Dialogue members had an honest discussion about the appropriateness of the following goals. All agree that jobs and economic stability are important to communities. Some Dialogue members also believe that economic opportunities have been used inappropriately in some cases to balance environmental and health issues.

Goal 7:

Stakeholders are informed of the economic implications of installation and munitions-related activities.

The economic well being of communities is often integrally linked to its overall economic and environmental health of an installation. Changes can positively or negatively impact a affected community, but this factor is not always a part of the discussions with stakeholders.

Possible Actions: Agency guidance should encourage field staff to inform the affected communities, including communities of color and low-income communities, of munitions-related employment opportunities. For example, at

the Badlands Bombing Range, members of the Oglala Sioux have been trained as EOD technicians. They now participate in the cleanup of Badlands and other ranges. Dialogue members recognize that munitions-related activities are unique and require specific skills.

Goal 8:

Stakeholder involvement in decisions about the use, reuse, redevelopment, and use restrictions of munitions ranges specifically include adjacent communities.

Communities adjacent to munitions ranges are often the ones most directly affected by the base's activities. When bases close down and are proposed for reuse or redevelopment, or existing uses change, it is these communities that are affected. In some stakeholder processes, neighborhoods less directly impacted or national stakeholders present themselves as representing the local community, and divert resources aimed at involving adjacent communities. While these stakeholders are important to the process because they bring different perspectives and expertise, they should not be involved in place of those living directly next to the range.

Possible Actions: DOD and the Services should develop and reinforce policies to specifically involve the communities directly adjacent to their ranges, and ensure that resources intended for affected communities stay with the affected communities.

CHAPTER 4 Technology and Science in Munitions

Introduction

Technology and Science can provide solutions to many of the explosives safety and environmental concerns that arise in various phases of the munitions life-cycle. To that end, the Dialogue Group examined the life-cycle of munitions from this viewpoint, focusing on safety and protection of human health and the environment.

The primary safety concern with munitions is unexploded ordnance and its corresponding explosives risk to DOD personnel and the public. Human health and environmental concerns include exposure of the public, employees, and troops to toxic residuals in the air, soil, ground and surface waters, range fires, impacts to the natural resources, and damage to cultural and archeological resources. Such concerns can arise at any point in the munitions life-cycle.

The DOD definition of life-cycle for weapons systems is “all phases of the system’s life including research, development, test and evaluation, production, deployment (inventory), operations and support, and disposal.”³ Also see Box 1, “Environmental Requirements During Design and Development.”

For this report, munitions life-cycle also includes storage, transportation, training and other munitions uses, demilitarization, resource recovery, treatment, and munitions cleanup and range response actions.

This chapter specifically examines the application of science and technology to: *Production Acquisition and Use, Range Clearance and Range Response, and Demilitarization*. These sections of the Chapter encompass most of the phases listed above. The group recognized that information or technology developed in one phase is useful in making decisions in another, making it critical that avenues for information exchange exist throughout the lifecycle process. In each section of this Chapter, the Dialogue Group identified a possible goal, suggestions for reaching those goals, and where appropriate, potential actions.

³ Joint Publication 1-02, “DOD Dictionary of Military and Associated Terms,” <http://www.dtic.mil/doctrine/jel/doddict/>

Production, Acquisition, and Use

The production, acquisition, and use phase of the munitions life-cycle refers to the identification of need for munitions, along with their design and development. By considering human health, safety, and environmental stewardship in the design and manufacture of munitions, DOD can improve operational readiness, reduce fiscal liabilities, and minimize environmental impacts associated with the entire munitions life-cycle. DOD and the Services have begun to realize the importance and value in addressing unexploded ordnance and munitions constituents (UXO(C)) issues at the conceptual and design stages of munitions development, rather than just during the subsequent stages of production, demilitarization, or cleanup of sites where munitions were used. For more information on DOD initiatives regarding these issues, please refer to Box 1.

With respect to Production Acquisition and Use, Dialogue members focused primarily on the use of science and technology to continue to design “green” munitions, for combat and training. Green munitions are those munitions developed with the goal of reducing their adverse environmental impact throughout their life-cycle. Many Dialogue members believe that when made widely available, green munitions may enhance military preparedness by increasing the number of ranges available to the Services for military training and decreasing the likelihood of training interruptions for environmental testing, monitoring, and cleanup. Use of green munitions is expected to result in cost savings over the life-cycle of munitions. In addition to reduced cleanup costs, green munitions may also reduce the cost of production and demilitarization by reducing costs associated with disposal of hazardous waste streams. For characteristics and benefits of Green Munitions, please refer to Box 2.

Other technologies addressed by the group include the increased development and use of environmentally friendly alternatives to live fire training, such as simulator banks and munitions with inert components.

Box 1: Environmental Requirements During Design and Development

The DODD 5000.1 (Defense Acquisition) states, “it is DOD Policy to prevent, mitigate, or remediate environmental damage caused by acquisition programs. Prudent investment in pollution prevention can reduce life-cycle environmental costs and liability while improving environmental quality and program performance. In designing, manufacturing, testing, operating, and disposing of systems, all forms of pollution shall be prevented or reduced at the sources whenever possible.

DODR 5000.2-R Mandatory Procedures for Major Defense Acquisition Programs requires that each program manager shall ensure that systems can be tested, operated, maintained, and repaired in compliance with environmental regulations.

Both 5000.1 & .2 are being re-written and additional emphasis is being placed on incorporating environmental requirements into the “front end” or development of a system. Updates should be formalized by the end of 2000.

Box 2: Green Munitions

Characteristics of green munitions:

- Allow for minimal use and release of toxic materials throughout their lifecycle;
- Possess a certain level of ease in identifying whether they have performed as intended or still pose explosives risk; and
- Maintain ease of disarming and recovery after firing.

Benefits of green munitions:

- Minimized risk of causing unintended range fires;
- Contribute to a reduced cost of UXO and other environmental remediation;
- Biodegradable in the environment; and
- Their design allows for ease of demilitarization and resource recovery.

These characteristics and benefits can be achieved at the manufacturing stage of newly designed munitions and in some cases, can be added by modifying munitions in the existing stockpile.

Another factor that needs to be considered in the production and manufacturing of munitions, is that these processes themselves can endanger human health and the environment. Hazardous substances used in these processes, if not managed properly throughout the munitions life-cycle, can create problems at production and demilitarization facilities and on ranges. Some existing DOD programs that seek to protect human health and the environment during the production and acquisition stages of the munitions life-cycle are described in Boxes 3 through 7.

DOD can benefit from the effective involvement of the public, regulators, and private industry in the production, acquisition, and use of green munitions. By involving all stakeholders in the research, development, production, and acquisition of green munitions, DOD can improve decision making and build public trust and confidence in their decisions.

Goal for Production, Acquisition and Use of Munitions:

To design, build, buy and use munitions that reduce the potential for explosives safety mishaps, and minimize adverse human health and environmental effects throughout the munitions life-cycle, while meeting military performance specifications.

Suggestions for reaching the goal:

1. *Life-cycle Analysis.* The DOD acquisition process should capture and evaluate all impacts and costs associated with the management of munitions throughout their life-cycle (initial development, production, transportation, storage, use, demilitarization, including recycling, and range UXO(C) response). This evaluation would benefit from public stakeholder input.

2. *Program Integration.* The DOD acquisition and production communities should work close with those communities involved with other phases of the

Box 3: Green Bullets

The “Green Bullet” program is a Department of Defense initiative to eliminate the use of hazardous materials in both the process by which small caliber ammunition is manufactured as well as the final product. This fully integrated program is spearheaded by the Small Caliber Ammunition Group within the Army’s Armament Research, Development and Engineering Center (ARDEC) and encompasses all environmental aspects of the small caliber ammunition from 5.56mm through .50 Caliber. Specific thrusts include the elimination of Ozone Depleting Chemicals (ODCs), Volatile Organic Compounds (VOCs), and heavy metals in the manufacture of primers and projectiles in the entire family of small caliber ammunition. Additional information can be found on the Green Ammo website at <http://www.pica.army.mil/greenammo/>.

Box 4: Green Missile Program

The Green Missile Program, an integrated pollution prevention research effort funded by the Strategic Environmental Research and Development Program (SERDP), is designed to develop alternative materials and technologies for solid rocket motor propulsion systems. The program has team members representing Army, Navy, Air Force, NASA, DOE, and EPA.

The specific objectives of the program are to: (1) develop propellants which do not contain lead catalyst for both extrudable and castable propellant processes; (2) develop and demonstrate complete and clean hydrochloric acid-free combustion; and (3) develop and demonstrate the use of liquefied gases and supercritical fluids for environmentally friendly processing of energetic oxidizers and components resulting in elimination of solvents and reductions in VOC waste stream generation.

munitions life-cycle (e.g., demilitarization and range clearance communities) to improve environmental and other aspects of munitions design and manufacture. The prevention of UXO(C) and other harmful end products must be integrated into other mission areas within DOD (e.g., weapons testing, maintenance, transportation, management of open burn/open detonation (OB/OD) units, live fire training), and developed in coordination with other relevant government programs (e.g., BLM, USFS, EPA), and appropriate public stakeholders. These initiatives should also be used to support efforts by foreign militaries and their contractors to develop and use environmentally protective munitions.

Box 5: Green Energetic Materials (GEM)

The Navy GEM program combines affordable, high performance energetic components with reduced lifecycle pollution costs through the integration of emerging energetic ingredients, manufacturing processes, and environmentally friendly resource, recovery, and recycling techniques. Pollution prevention goals will be achieved by: (1) eliminating solvents from the manufacturing and demilitarization operations; (2) eliminating hydrochloric acid emissions; and (3) eliminating the need for OB/OD disposal.

3. *Material Selection and Munitions Design.* DOD should maximize the development and use of green munitions. These munitions reduce the number of undesirable end-products (e.g., hazardous waste streams, UXO(C) contamination, range fires, and toxic releases) through improved material selection and munitions design. Initially, DOD should continue to develop training munitions that are less toxic or non-toxic, more biodegradable, and/or easily located, identified, determined to be inert or explosive, and recovered after use or firing. Ultimately, DOD should continue to develop lethal munitions and missiles that have these same characteristics. DOD should involve public stakeholders in the development of selection criteria for materials in weapons systems.

Box 6: Insensitive Munitions Program (IM)

This is not an environmental program per se, but it does provide some environmental benefits. It is meant to improve weapon unit and platform survivability and to be protective of human health and safety. The purpose of having “insensitive” munitions is to reduce reaction violence and collateral damage resulting when munitions are exposed to unplanned stimuli such as heat, shock, and impact. DOD policy requires compliance with insensitive munitions requirements.

Munitions are subjected to heat, shock, and impact to simulate the most violent stimuli that could reasonably be expected. Those that do not meet IM criteria are either rejected pending further improvements, or waived if the circumstances of the individual case permit.

4. *Use of “green” munitions by foreign militaries.* The United States should support efforts by foreign militaries to develop and use environmentally protective munitions through technology and data sharing agreements. When compatible green munitions are available, the United States should require that they be used during training by foreign militaries in the United States.

5. *Simulation/Training.* DOD should continue to expand its initiatives to reduce live firing in training by more extensive use of simulators or inert munitions. Where live fire training cannot be adequately replaced with use of training simulation, DOD should develop and use munitions that minimize environmental impacts of training.

6. *Operational Requirements/Funding.* It is important for DOD to fully understand and share with stakeholders the operational/readiness, fiscal, and environmental benefits associated with the use of green munitions. The operational communities should generate the necessary requirements for green munitions and make their development a high funding priority.

7. *Tags and Taggants.*

a) *New Munitions.* In the design and production of new munitions, DOD should consider including electronic tags or chemical taggants, until such time as new munitions are available that: (a) generate fewer harmful end products, e.g., UXO; or (b) UXO detection technologies are able to adequately detect and identify UXO range clearance problems.⁴

b) *Existing Munitions.* DOD should categorize/prioritize all existing inventories/stockpiles of training and combat munitions based on frequency of use, dud rates, degree of explosive or other hazard, and ease/difficulty of UXO detection, discrimination, and recovery. This data would be useful in prioritizing the development of, and in developing better, greener munitions. Priority should be given to developing tags for munitions in existing stockpiles which are the most difficult to detect once used, and most likely to generate UXO or other hazards.

Tags must withstand environmental degradation and physical stresses generated at firing and impact.

Box 7: Weapon Systems Explosives Safety Review

Every Service program manager, weapon system designer, producer, processor, package handler, or user of a weapon system is responsible for explosives safety. All weapon system acquisition programs are reviewed at designated intervals in the acquisition cycle to assure that system safety and environmental requirements are met prior to introduction. No weapon system acquisition program, regardless of acquisition category level, can proceed to approval for full production without an explosives safety review. Within the Department of the Navy the Weapons System Explosives Safety Review Board is responsible for reviewing and approving weapons system acquisition programs. In the Army, the Department of the Army Explosives Safety Council (DAESC) and the U.S. Army Technical Center of Explosives Safety (USATCES) are responsible for these functions, while the Air Force provides the same oversight through the Air Armament Center at Eglin AFB, FL.

All programs must submit a detailed demilitarization plan, which the Military Service demilitarization program manager reviews and approves. All programs must also comply with environmental requirements, throughout the lifecycle of the munitions, as set forth by the Resource Conservation and Recovery Act, and the National Environmental Policy Act. A technical expert in the field of environmental protection reviews these aspects.

⁴ Finding UXO during range clearance at active, inactive, closed, and transferred ranges, and UXO that landed off-range, is a costly and somewhat uncertain task using current technologies. The Defense Science Board Task Force on UXO has recommended consideration of tagging munitions before use.

Range Clearance and Range Response⁵

Testing and training ranges are assets critical to DOD's mission. They should be operated and managed to preserve their continued use and reduce their long-term environmental liability. The challenge for DOD is to create a balance between the need for using ranges, thus leading to potential adverse impacts on the environment on and surrounding the range, and the fact that ranges are finite resources that need to be preserved in order to maintain military readiness.

The primary focus of Range Clearance and Range Response is the safe characterization, detection, recovery, and treatment of unexploded ordnance and the monitoring, control, recovery, and treatment of contaminants on ranges. Range response includes the assessment of past munitions activities at ranges, OB/OD sites, and burial sites. This section addresses that phase of the munitions life-cycle after the munition has been fired, dropped, launched, projected, placed, or otherwise used.

A fundamental premise of managing this important resource is having access to the necessary information about the baseline status of the range, the activities that have occurred and will occur on the range, and the residual effects of those activities. Historically, insufficient consideration has been given to collection of such information and development of the wide variety of predictive tools required. Instead the focus has been on controlling or mitigating residual effects. This has resulted in the creation of many unintended and unanticipated problems that are now proving intractable or expensive to solve.

Goal for Range Clearance and Range Response on Munitions Ranges:

To develop, apply, and coordinate science and technology initiatives to facilitate sustainable range management and range UXO(C) cleanup to ensure long term viability of active ranges and make former ranges available for future uses. These initiatives should include a comprehensive range inventory, improved UXO detection and response technologies, understanding UXO degradation, fate, and transport, and the special needs associated with water ranges.

⁵ Where applicable, this section includes consideration of adjacent lands and other properties (e.g., scrap yards, ammunition plants, DOD distribution depots, OB/OD, landfills, and former DOD properties) suspected or known to contain UXO, and includes but is not limited to all munitions-related contamination. Dialogue members recognize this subject needs further discussion and it is addressed in Chapter 5.

Suggestions for reaching the goal:

1. A Comprehensive Range Inventory

Summary: Knowledge of where munitions are and were fired, landed, open burned or open detonated or buried is critical for conducting science-based response operations, projecting funding requirements, accurately assessing risks, and assuring protection of human health and the environment. Unfortunately, DOD real property records do not track historical land uses. Similarly, records on the location and operation of coastal- and offshore-water ranges are limited, as in many of these cases, there is no real property record involved. As a result there are many ranges that have been closed or transferred from DOD control that are not reflected in current land use records or master planning documents. Therefore, there is need for DOD to conduct a comprehensive inventory of all military ranges (i.e., active, inactive, closed, transferring, or transferred ranges).

Possible Actions:

1. DOD should complete a comprehensive range inventory of all ranges to include all active, inactive, closed, transferring, and transferred ranges, where munitions were used or detonated and there is a potential for UXO. This inventory should include all ranges currently known, those brought into use in the future, and those closed or transferred ranges that are discovered in the future. All Dialogue members acknowledge that there are other sites where munitions have been stored, disposed or buried. Some Dialogue members stress that where these areas are known, records should be kept as well. However, all Dialogue members agree that priority should be placed on completing the comprehensive range inventory for ranges. DOD should also make an effort to determine if other entities have interest in each property (e.g., Federal land management agencies). The nature of that interest (e.g., the land is used subject to a public land withdrawal) should be developed with input from regulatory and land management agencies and the public. The comprehensive range inventory should be compiled on a readily accessible computer-based system containing information on all ranges. Where possible, information on the location and hazards associated with these ranges should be made available to the public.
2. The inventory should include the following information: range parameters (e.g., boundaries, firing lines, targets/impact zones); munitions used (e.g., types, quantities, locations--on and off range, and estimated dud rates); and any range clearance actions conducted (including when, where, detection technologies used, what was found and its condition, e.g., its stability and whether live or fused).
3. To ensure accuracy, DOD should develop agency-wide definitions, plans, and procedures for conducting the inventory. DOD should develop a standardized methodology for obtaining oral histories, conducting archival searches (listing sources that must be contacted), and detailing specific information

requirements. Specific report formats should be required. Provision should be made to capture information that indicates potential off target and off range incidents of potential contamination or UXO. In developing this methodology, DOD should assess the effectiveness of the procedures used in the past to identify potential areas containing UXO. If necessary, DOD should revise those procedures to correct any identified deficiencies, and standardize the revised procedures to assure commonality in the approach used in conducting UXO inventory and response actions. Because, in some cases, detailed information about the presence of UXO may pose threats to public safety or national security, some Dialogue members believe that DOD should consult with other stakeholders about when and in what form to make such data widely available. Other Dialogue members caution that the rationale of protecting national security has placed unnecessary restrictions on access to needed information, and that public safety may be compromised by not making such information widely available.

4. DOD should undertake efforts to develop, field, and fund the necessary systems to collect and maintain the permanent records of all expenditures of ammunition and explosives by type, quantity, location, and estimated dud rate required under DODI 4715.11 and 4715.12, Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges Within the United States (4715.11) and outside the U.S. (4715.12).

2. Improved Unexploded Ordnance (UXO) Detection, Discrimination, Recovery, and Destruction Technologies

Summary: The ability to effectively respond to unexploded ordnance on military ranges has several steps: it must be found; determined to be UXO; excavated or otherwise recovered; identified as to type of munition, the presence of explosives, fuses, hazardous chemical constituents, and stability; and then destroyed. Each step in the process is directly related to the preceding step, and the effectiveness of each step is directly tied to the effectiveness of the preceding step.

A clear need to develop and use improved technologies to increase the ability to accurately detect and discriminate UXO items, often over very large territories, is increasingly being realized. In April 1998, a Defense Science Board (DSB) Task Force released a report *“Unexploded Ordnance (UXO) Clearance, Active Range Clearance, and Explosives Ordnance Disposal Programs.”* The critical finding of that report is: “The key to more efficient UXO remediation lies in the products that can come from an aggressive development of cost effective remediation technology to replace currently fielded tools and practices.” In addition, the DOD *“Report to Congress: Unexploded Ordnance Clearance,”* dated March 25, 1997 emphasizes the value of technology by stating that “technology solutions are now potentially available to us that were not available as recently as a few years ago.”

In the area of UXO detection and discrimination, a number of significantly improved digital georeferenced techniques (using digital enhancement and filtering methods) have already been developed and successfully demonstrated. Yet, they have only recently emerged as commonly used technologies for response. A stronger commitment needs to be made to more aggressively (more rapidly and extensively) use proven technologies.

DOD faces several challenges with respect to detection, discrimination, recovery, and destruction of UXO. These challenges in many cases illustrate the need for improved technologies. While the primary focus has been on improvement of detection and discrimination systems, little attention has been directed at improving the technology to actually recover, when safe to do so, the UXO. In addition, there are issues regarding the ability to safely move the UXO, once detected and identified, and to determine what, if any, chemical hazards exist. Also, in the destruction phase, decisions regarding where and how to detonate UXO must be made. When in-place detonation is the most appropriate alternative, common practice is to use stacked sand bags, which has several disadvantages (e.g., labor intensive, time consuming, potential for release of metal, unconsumed explosive compounds or other organic compounds into the environment). There are some alternatives to open burn and open detonation; however, there is a need to understand the environmental science and health impacts of open burn and open detonation. Developing additional methods will be important to the UXO response program. In the absence of sound scientific information, environmental concerns and regulatory agency and public opposition to open burn and open detonation currently act to limit its utility, and further encourage the acquisition of additional information and ultimately the development of other alternatives.

Possible Actions:

1. DOD should develop an integrated and adequately funded program to address development and accelerated fielding of UXO detection, discrimination, recovery, identification, and destruction systems. This program should optimize the allocation of resources to ensure cohesive advancement of technology in each arena and support efforts to remove fiscal, procurement, contractual, logistical, organization, and policy impediments to the development and accelerated fielding of systems.
2. DOD should undertake a study of munitions recovery, identification, and destruction technologies under a construct similar to the DSB Task Force on Unexploded Ordnance Clearance, Active Range Clearance, and Explosives Ordnance Disposal Programs.
3. DOD should implement mechanisms to track, document, and disseminate information on the state-of-the-art and progress of technology advancement and to make this information readily accessible in a timely manner to regulators and the public, as well as to implementing DOD components and contractors. This information should include validation test results as well as controlled demonstrations.

4. DOD should define the UXO clearance and cleanup processes with a goal of
a) creating a common understanding by all stakeholders, and b) deriving a
method to determine and apply the best technology at a particular phase for a
given site.

3. Knowledge Base in the Areas of UXO Degradation and Migration and the Environmental Fate, Effect, and Transport of Munitions Constituents

Summary: Presently, there is only a limited knowledge base on the degradation of UXO in the environment, both in terms of the effects of environmental conditions on the metal casing (e.g., heat, cold, weathering, exposure to fresh, brackish, or salt water), and in terms of the effects on the stability of the explosives in the UXO. In addition, there appears to be no significant body of knowledge regarding UXO/munitions migration or exposure due to migration. Finally, while there is information on the environmental fate and transport of many explosives and other munitions constituents, this knowledge base needs significant expansion. Many factors are important in assessing the present and future hazards posed by UXO/munitions. These include how UXO/munitions migrate, at what rate they degrade in different environments, the presence, concentration, and fate and transport of explosives and other munitions constituents, and the environmental effects that might stem from the release of the munitions constituents.

Possible Actions:

1. DOD should undertake an assessment of the current body of knowledge on UXO stability and integrity and undertake such studies as are necessary to address shortfalls in the body of knowledge in these arenas.
2. DOD should undertake an assessment of the current body of knowledge on the affects of physical phenomena, such as erosion, frost heave, tides, or currents, that may cause UXO to migrate or become exposed, and undertake such studies as are necessary to address shortfalls in the body of knowledge on these phenomena.
3. DOD should undertake an assessment of the current body of knowledge on the environmental fate and transport and toxicological properties of munitions constituents, identify those widely used constituents where there is insufficient information, and undertake such studies as are necessary to address shortfalls in the body of knowledge on the environmental fate and transport and toxicological properties of munitions constituents.
4. DOD should undertake an assessment of the current body of knowledge on the emissions stemming from the use or disposal of munitions and undertake such studies as are necessary to address shortfalls in the body of knowledge.
5. DOD should involve the public, the scientific community, and regulatory agencies in the design, conduct, and publication of the results of these studies.

6. Results of these studies should be factored into the design and all other phases of the munitions life-cycle.

4. Water Ranges

Summary: While water ranges pose many of the same concerns as land ranges, they also pose special concerns and unique challenges in the conduct of response actions. Little work has been done to advance ability to effectively assess the hazards posed or conduct effective response actions at such ranges. Despite the difficulties inherent in operating in these environments, potential impacts must be considered and, where warranted, appropriate responses taken.

Possible Actions:

1. DOD should consistently implement standard methodologies for dissemination of information on water ranges such as chart notations, Notices to Mariners, or marking with buoys or signs.
2. DOD should include in the comprehensive inventory of range information on whether the range is or contains water bodies or wetlands. This will require developing a method for distinguishing between range types and locations.
3. DOD should develop such specific UXO detection, discrimination, recovery, identification, and destruction technologies as are needed to address water ranges.
4. DOD should develop ways to detect and remove UXO from dredged sediment and sand.

5. Access Controls

Summary: Both before and after clearance activity, access controls (e.g., signs, fences, patrols) may be necessary to discourage public encounters with UXO on ranges and at disposal sites. Yet today, there is no consistency for putting such controls in place. In fact, there is little scientific research to serve as a basis for establishing such standards.

Possible Actions:

1. DOD should support, in cooperation with other stakeholders, research on the effectiveness and long-term reliability of measures such as signs, fences, patrols, and public education programs to discourage entry onto land believed to contain UXO and other explosive hazards.
2. DOD in partnership with regulatory agencies and in consultation with other stakeholders should consider development of adaptable guidelines for the imposition of access controls both before and after clearance. Because the effectiveness and long term reliability of standard access controls are likely to vary by location, it is important that such standards only be regarded as guidelines to be evaluated and modified by all local stakeholders to fit the needs at each facility.

6. Better Communication on UXO Technology and Initiatives.

Summary: There are a number of ongoing initiatives to develop, evaluate, and field improved technologies for the detection, discrimination, recovery, identification, and destruction of UXO; however, information on these initiatives often is not readily available to those that might benefit from access to that information. DOD decisions that could benefit from such information include:

- (a) identifying ranges, OB/OD sites, UXO/munitions burial sites, and the location of potential UXO areas;
- (b) the selection of areas to survey or not to survey using UXO/munitions detection techniques; and
- (c) the selection of detection techniques. History indicates that regulator and public involvement may improve the results and reduce the costs of these identification/detection activities.

Possible Actions:

1. DOD should develop and regularly update a publicly accessible database of information on existing UXO detection, discrimination, recovery, identification, and destruction technologies, including information from demonstrations and validations on costs, effectiveness, applications, and limitations.
2. DOD should develop a similar publicly accessible database on programs and initiatives to develop and field new UXO detection, discrimination, recovery, identification, and destruction systems. In addition, DOD should look to other appropriate forums/approaches for community input and priorities regarding criteria to assess the emerging or developing technologies in these areas.
3. DOD should develop summaries of information on existing UXO technologies, including information on costs, effectiveness, applications, and limitations and initiatives to develop and field new UXO detection, discrimination, recovery, identification, and destruction systems for distribution through public involvement processes. These mechanisms also should be developed to provide for adequate exchange of information between different DOD agencies or commands, as well as between the DOD, the Department of Energy, the Environmental Protection Agency, and any other government entities involved in developing, evaluating, or otherwise addressing UXO detection, discrimination, recovery, identification, and destruction systems.
4. DOD should develop and implement policies to fully involve regulators and the public (as outlined in the DOD proposed range rule, excluding the removal section) in DOD decisions related to: a) identifying ranges, OB/OD sites, UXO/munitions burial sites, and the location of potential UXO areas; b) the selection of areas to survey or not to survey using UXO/munitions detection and other techniques; and c) the selection of those detection techniques.

Munitions Demilitarization

Demilitarization is one of the final stages of the life-cycle for munitions that are either excess, obsolete, or unserviceable to military requirements. In its broadest context, demilitarization is the process of rendering a munition harmless or ineffectual for military use by removing the offensive or defensive military characteristics of the item. There are a variety of means to achieve demilitarization, including, but not limited to:

- ★ alteration,
- ★ disassembly for recycling, reclamation, or reuse of subcomponents,
- ★ mutilation, or
- ★ destruction of the munition.

Currently, DOD stores over 500 thousand tons of unserviceable, excess, and obsolete conventional ammunition, an increase of over 300% since FY80. Until demilitarized, the management and maintenance of the demilitarization stockpile absorbs storage space and resources. Fiscal constraints, as well as an increasing societal concern for improved management of all forms of waste and emissions from munitions demilitarization have placed additional limitations on the alternatives available to the demilitarization programs. Demilitarization decisions must consider storing munitions awaiting demilitarization, selection and availability of suitable technologies (including resource recovery and recycling), minimizing and mitigating environmental impacts, ensuring the safety of personnel and potentially affected communities, and cost.

In recent years, DOD has dramatically increased its use of resource recovery and recycling (R3) technologies to demilitarize munitions. The principle method of treatment for those munitions not demilitarized by R3 methods, is currently OB/OD. Generally, DOD views OB/OD as cost effective; however, they lack the data to adequately characterize potential contingent liabilities. These liabilities include permit fees, closure and remediation costs, potential environmental and public health impacts, as well as the opportunity costs associated with resources lost through destructive treatment technologies. While DOD is actively seeking alternative technologies, it relies on OB/OD to demilitarize certain munitions until such alternative technologies become available. Some Dialogue members believe that the use of OB/OD must be minimized, and used only in extraordinary circumstances, to limit potential environmental and health impacts.

Goal for Demilitarization of Munitions:

To continue to aggressively develop and use methods that are safe, cost effective, scientifically sound, and acceptable to regulators and other stakeholders to expeditiously reduce the inventory of munitions awaiting demilitarization.

Note: DOD already has a number of programs under way that address many of the following recommendations. These suggestions are meant to support, underscore the importance of, and encourage the expansion of these programs.

Suggestions for reaching the goal:

1. DOD should develop and implement an overall demilitarization strategy that optimizes use of environmentally and economically acceptable methods and technologies, and that encourages reuse and recycling whenever possible.
2. DOD should conduct studies to determine the environmental impact of OB/OD (including various OB/OD site designs) and alternative technologies (effluent stream analysis) on air, soil, ground water, and surface water. Results of the studies should be factored into the overall demilitarization strategy.
3. Based on the knowledge gained from the studies in 2 above, DOD should develop a strategy and subsequent policies on the use of OB/OD and alternative technologies.
4. DOD should develop guidance on the design, use, monitoring, and closure aspects of all types of munitions demilitarization units (including OB/OD) to specifically address environmental concerns.
5. Where possible, DOD should expand their efforts to research, develop and use sound alternatives to OB/OD. Alternatives should include, but not be limited to, the use of detonation chambers, closed-burn facilities, consideration of reclamation of explosives for military or commercial uses, and reclamation of munitions components.
6. DOD should seek involvement from public stakeholders and State and Federal regulators in the development of demilitarization technologies, strategies, studies, policies, and guidance. Steps should be taken to ensure that historically under represented sectors of society are included in this process.

CHAPTER 5

Issues Needing Further Consideration

Introduction

As the Dialogue evolved over the course of three years, munitions issues emerged that this Dialogue could not fully address, but felt important to identify for future discussions among DOD and concerned stakeholders. This Chapter provides a summary of a discussion the Dialogue had at its last meeting about issues that may require future discussion or evaluation, and suggestions for the composition and structure of future dialogues.

Potential Issues for Discussion

At their final meeting, DOD asked Dialogue members to identify issues that may require future discussion among DOD and concerned stakeholders. This is a record of issues Dialogue members raised but does not reflect consensus and is not prioritized. Some of these issues may be able to be addressed through conversations with individual stakeholders; others may require discussions in future dialogues between DOD and concerned stakeholders.

- ★ *Control of Access to Ranges:* Some Dialogue members believed that issues such as consistent signage and working with local communities and stakeholders to control access to ranges is a potential topic for further discussion.
- ★ *Research & Development Issues:* It was suggested that DOD consider involving external stakeholders more in its munitions Research & Development (R&D) processes because this is where many environmental and safety issues could be addressed. The Assembled Chemical Weapons Assessment Dialogue process was cited as an example where DOD has successfully brought external stakeholders into its R&D processes.
- ★ *Characterization of Properties with UXO and Hazardous Substances:* Some Dialogue members believed that further clarification of how to characterize and manage properties with UXO is needed.
- ★ *Local Implementation of Policy:* Some Dialogue members discussed throughout the Dialogue the unevenness of policy implementation within DOD. Some members believed that further dialogues would be helpful to determine how policy implementation can be made more consistent at both the regional and local levels.
- ★ *Record-keeping Issues:* Several Dialogue members believed that further discussion is needed on the record-keeping issues raised in Chapter 2 under

Principle 6 to address keeping track of records for sites not included in the Comprehensive Range Inventory.

- ★ *Balancing Protection of High Value Habitat with Range Response:* Some Dialogue members indicated that further discussion regarding habitat protection and range activities as discussed in Chapter 2, Principle 7, would be helpful.
- ★ *UXO: R&D, Training, Demilitarization:* It was suggested that UXO should be the topic of a Federal Advisory Committee Act (FACA)-chartered dialogue. Possible UXO-related topics for discussion include R&D, training and demilitarization.
- ★ *Better Stakeholder Involvement in General:* Several Dialogue members noted that DOD has made significant effort to involve stakeholders in many aspects of installations and policy decisions. While these stakeholders acknowledge some successes, they believe that DOD can still make improvements by more broadly involving stakeholders in such decisions.
- ★ *RAB Issues:* Since 1993, DOD has established hundreds of RABs across the country. Some Dialogue members believe that implementation of RABs, including issues such as participation, could benefit from discussions with DOD stakeholders and those who have been involved with RABs across the country.
- ★ *Creating Cultural Change:* Throughout the Dialogue, members noted that many of the changes to address the issues raised in this report require a cultural change. Discussions about how to help create this kind of change would be helpful.
- ★ *Creating Independent Centers of Expertise on Munitions:* It was suggested that DOD and concerned stakeholders could benefit from the formation of independent centers of expertise, at universities or elsewhere, to study munitions-related issues.
- ★ *Developing a Better Understanding of the Munitions Clearance and Cleanup Process to Include Appropriate Technology Application:* It was noted that DOD and concerned stakeholders would benefit from sharing more information regarding the process of clearing and cleaning up ranges and the appropriate places in which to apply technology in that process.

Suggestions for Future Public Involvement

Because DOD looks to continue stakeholder involvement in discussions about munitions-related issues, it asked Dialogue members for advice on how best to do this. At the last meeting, Dialogue members brainstormed potential mechanisms for involving stakeholders. Suggestions included:

- ★ Creating a National Advisory Board with rotating membership (e.g., DOE's Environmental Management Advisory Board (EMAB)).
- ★ Including external stakeholders in Operational and Environmental Executive Steering Committee for Munitions (OEESCM) subcommittees.
- ★ Establishing a FACA Committee to address some of the issues identified above.
- ★ Creating an umbrella committee with ability to establish working groups to address specific issues such as the ones listed above.

Dialogue members also stressed that seeking diverse perspectives is essential to any stakeholder involvement effort in munitions-related issues. Dialogue members identified several perspectives that should be included in any discussion. These perspectives are not all-inclusive and will change depending on the issues being discussed.

- ★ Local, affected, and environmental justice communities.
- ★ Grassroots activists.
- ★ States (e.g., National Association of Attorneys General (NAAG), National Governors' Association (NGA)).
- ★ Federal agencies.
- ★ Grassroots and national environmental groups.
- ★ Scientific community (e.g., National Academy of Sciences (NAS), American Chemical Society (ACS), American Physical Society (APS) and grassroots).

DOD agreed to consider the above input when determining next steps for stakeholder involvement. These plans for next steps are detailed in the final Chapter of this report.

CHAPTER 6

DOD Actions Taken To-Date and Planned Next Steps

Introduction

One of the most important outcomes of any Dialogue is the action taken as a result of the discussions. This chapter contains three sections:

- ★ A summary of DOD actions to-date that are responsive to the Dialogue deliberations;
- ★ The activities DOD plans to undertake in regard to future stakeholder involvement; and
- ★ The approach DOD will use to review chapters 1 through 5 and develop an action plan to address issues this report raises.

This chapter is fundamentally different than the previous five chapters. The other chapters are a summary of the full Dialogue's discussions. The recommendations set forth in those chapters were not developed by consensus; rather they reflect the diverse views of all Dialogue participants. This final chapter, which is written solely by DOD, summarizes what DOD has already undertaken and current plans on what it will undertake in the future in response to the Dialogue recommendations. In addition, this final chapter discusses DOD's process for reviewing the entire report and responding back to Dialogue members.

Actions Taken To-Date

This section details the major actions DOD has taken in recent months that are responsive to the concerns and ideas raised by the Dialogue.

Establishing the OEESCM

DOD created the Operational and Environmental Executive Steering Committee for Munitions in September 1998. The OEESCM brings together the DOD communities responsible for each of the major phases of the munitions lifecycle. Its mission is to develop recommendations for overarching DOD policies, positions, and action plans related to the lifecycle management of munitions. This is done to support readiness by balancing operational needs, explosives safety, and environmental stewardship throughout the lifecycle. OEESCM members are Flag Officers and Senior Executive Service members from the Joint Staff, the Office of the Secretary of Defense, and the four Services, (Army, Marine Corps, Navy, and Air Force). The members represent all DOD

communities with a role in munitions, to include: the operational community (mission operators and trainers), the logistical community (munitions managers), the environmental community, and the explosives safety community. The OEESCM does not include non-DOD members. However, the next section of this document discusses steps DOD plans for enhancing the role of stakeholder input into its overall decision-making process.

Within the OEESCM, various subcommittees have already begun to take action to address many of the issues raised during the Dialogue. The OEESCM's subcommittees are: Acquisition; Munitions Stockpile Management, which includes demilitarization; Range and Munitions Use; Range Response; and Stakeholder Involvement.

Formation of the SISC

The establishment of a permanent Stakeholder Involvement Subcommittee (SISC) is one of the OEESCM's most significant Dialogue-related actions. This subcommittee is an internal DOD working group organized to make recommendations to the OEESCM concerning stakeholder involvement. Because many SISC members are also Dialogue participants, the Dialogue has helped the SISC frame objectives to be included in a DOD stakeholder involvement plan.

The SISC has drafted a mission statement and strategy for DOD to conduct its stakeholder involvement activities. This material is contained in the draft DOD Munitions Action Plan (MAP) that the OEESCM is developing at the direction of the Undersecretary of Defense (Acquisition and Technology). The MAP is a strategic roadmap to address concerns with explosives safety and environmental effects of munitions acquisition, management, usage, demilitarization, and response. The MAP's goals, objectives, and actions include research and development, policy development, data acquisition, and stakeholder involvement activities. The SISC has distributed the draft MAP to Dialogue members and to other stakeholders for review and comment. They, in coordination with the other OEESCM subcommittees, reviewed each of the stakeholder comments and recommended appropriate modifications to the MAP. A complete list of the comments and the actions DOD has taken with regard to them is being developed for distribution to the commenters. The MAP, which is expected to be completed by October, 2000, will be available on the DENIX website (<http://www.denix.osd.mil/denix/DOD/Library/Munitions/oeescmworking.html>).

In addition to this internal mechanism, DOD has a number of existing stakeholder involvement efforts at the local, regional, and national levels that include community members; state, tribal, and federal regulators; and others. Examples include local Restoration Advisory Boards, the DOD Regional Environmental Coordinators, and this National Policy Dialogue on Military Munitions.

New Directives on Range Management

Another of the OEESCM initiatives was the development of new policies regarding explosives safety and environmental management on active and inactive ranges both within the United States and overseas. These policies are commonly referred to by their number: DOD Directive (DODD) 4715.11 (for ranges in the United States) and DODD 4715.12 (for ranges outside the United States). These policies reflect many of the proposals for sustainable range management developed through the Dialogue process, and captured in Chapter 2. Examples of Dialogue proposals that are addressed in these directives include: provisions for a comprehensive range inventory; technology development for sustainable range management; studies of environmental fate and transport of munitions constituents; restrictions on the use of submunitions and munitions containing depleted uranium; and involvement with stakeholders at the local, regional, and national levels.

Special Working Group on Residue

The OEESCM also established a special work group to develop DOD policy for the management and disposition of one important sub-component of range and munitions residue. The current draft policy focuses on safe and compliant methods of recycling metal scrap and other residues from ranges. The Dialogue also identified this as an issue in the area of sustainable range management. The name of the Special Workgroup is "Ammunition, Explosives, and Dangerous Articles Workgroup."

Range Inventory

The Services are conducting a comprehensive inventory of ranges as required by both DODD 4715.11/12 and the proposed Range Rule. The range inventory is responsive to many concerns the Dialogue raised. The OEESCM recognizes this effort as a necessary step in the development and implementation of truly comprehensive range sustainment and response programs. This is a major undertaking for the Services. The initial phase is expected to be completed by early 2001. The inventory will be updated on a continuing basis.

Policy Updates

The OEESCM Stockpile Management Subcommittee is reviewing all DOD and Service policies, directives, manuals, etc. for Military Munitions Rule applicability. The focus of this significant effort is to review and update DOD policies to ensure consistency with proper implementation of environmental regulations.

Increased Use of R3

The Dialogue identified the need to continually improve the methods that DOD uses to demilitarize excess, obsolete, and unserviceable munitions. DOD has increased its use of resource recovery and recycling (R3) in the demilitarization program. Coupled with an examination of ways to optimize the location and operation of open burning and open detonation treatment facilities, DOD continues to move from a demilitarization program based on OB/OD to one that

relies primarily on recycling. Starting in the 1990's, DOD established a research and development program to both examine the environmental impact of OB/OD and develop alternative demilitarization technologies. Today's technology allows many munitions to be demilitarized through melt-out, steam-out, or washout of the energetic materials. In many cases, the recovered energetic materials can be reused as explosives or further processed for other uses, such as feedstock for fertilizer. The Defense Ammunition Center manages DOD's robust munitions demilitarization technology program to develop safe, clean, and efficient demilitarization methods. Promising technologies for future demilitarization R&D and industrial use include supercritical water oxidation, cryofracture, and confined burning facilities.

Technology Development

The DOD RDT&E community has established technology development programs that will be responsive to many of the Dialogue's issues concerning environmental problems believed to be caused by munitions use on DOD ranges. In addition to the demilitarization technology effort described above, the DOD has developed comprehensive technology programs in Unexploded Ordnance detection; identification and discrimination; environmental impact of range use; and in munitions development and acquisition with emphasis on pollution prevention. The following paragraphs briefly summarize these additional RDT&E efforts.

The main objective of the DOD UXO RDT&E program is to develop technologies to significantly reduce risk by accurately characterizing former and current ranges. Another objective is to substantially reduce UXO site remediation costs by reducing the time and effort currently being spent on excavating non-hazardous items (false alarms) while maintaining probabilities of detection at or above current levels. Over the past five years, DOD has significantly increased its investments in this area and will continue to do so in the future. While improved technologies are currently being fielded, DOD is committed to accelerate the implementation of demonstrated innovative technologies. DOD's program plans for RDT&E for UXO will be detailed in a report to Congress to be issued in early 2001.

The DOD has initiated an extensive RDT&E program to fully understand the potential environmental impacts from munitions use on training and test ranges. Understanding these impacts will allow DOD to take appropriate management and technology actions both at its ranges and in its development of new munitions to predict, prevent, control, or remediate environmental damage. Environmental impacts of range use potentially involve hazard and risk issues on both human and ecological health. Issues under investigation include the effects at both firing points and in impact zones. The DOD is developing technologies for conducting comprehensive and quantitative hazard and risk assessment surveys related to munitions contaminants generated at DOD ranges in earth media, water, and the atmosphere. Fate and transport of munitions' constituents

is of prime concern. DOD has programs in place and planned for the near future to understand the potential release of energetic compounds and their fate in the environment. These programs will focus on firing point emissions, munitions, detonations in impact areas, UXO, and other related activities conducted on DOD ranges. DOD is also committed to understanding any potential impacts to the ecosystem of potentially toxic compounds that may be released to the environment through use of live munitions.

As noted by the Dialogue, DOD has had great success in recent years in developing green munitions. Programs such as the green bullet are now providing small caliber munitions that have a significantly reduced impact on the environment. DOD is continuing its pollution prevention RDT&E program to extend these earlier successful programs to other munitions items. The DOD pollution prevention RDT&E program is committed to developing green munitions and munitions management technologies. These include items such as the Micro Electro Mechanical Sensor that significantly reduces the pollution generated in the production of munitions, limits the potential for adverse environment effects on our ranges, and minimizes the environmental consequences of future demilitarization activities.

Next Steps for DOD Stakeholder Involvement

During the Dialogue process, stakeholder members indicated a desire to play an on-going and more effective role in the development of munitions policy. Although, by law, DOD is responsible for all policy decisions, it values the input of all stakeholders and particularly those who are directly impacted by decisions.

It is important to DOD to continue stakeholder participation, as we have gained much from this experience. We have begun to shape our plans for continuing stakeholder involvement as we draft and implement our munitions policies. As we indicated during the Dialogue meetings, the Federal Advisory Committee Act, as implemented by DOD, may not provide the best structure for our purpose. We intend, however, to broaden our understanding of the scope of the national level issues and concerns by scheduling a series of regional forums to solicit comments and suggestions from the public and local, state, and tribal governments. From these regional forums, we hope to further define the core issues of concern and establish an appropriate policy organization to lead us in intensive discussions among representative national-level participants.

However, DOD is already clear on certain aspects of its future stakeholder involvement efforts. These aspects include:

- ★ Stakeholders from diverse perspectives across the country, including those from: impacted communities; environmental and environmental justice groups; local, state, tribal, and federal regulators; and scientific and research organizations will be included.

- ★ Careful consideration to ensure the best use of stakeholder time and efforts will be a major focus.
- ★ Stakeholder input will be used to improve DOD's decision making, even though it will retain all decision-making authority, as required by law.
- ★ Consistency with the stakeholder involvement mission and objectives established in the MAP will be a primary concern. The SISC mission is:

To build public confidence and foster more informed decision making by maintaining a dialogue with stakeholders concerning munitions life cycle issues that may impact public health, safety, and the environment.

The SISC objectives focus on developing an effective process to support the mission and are to:

1. Identify and engage representative stakeholders (DOD and non-DOD) to develop and participate in national and local munitions dialogues.
2. Integrate local and national stakeholder involvement efforts to ensure that information is shared and issues are addressed at appropriate levels.
3. Develop outreach, educational, and communication materials to provide all participants with the information and skills necessary to contribute productively in the stakeholder involvement program.
4. Monitor the progress and ensure the effectiveness of stakeholder involvement efforts (Quality Assurance, Measures of Merit, etc.).

Given the upcoming change in Administration, DOD acknowledges that the establishment of its process on stakeholder involvement will not happen as quickly as some desire. In the interim, DOD commits to the following actions and plans to initiate these actions immediately upon completion of this Report.

- ★ Identify effective structures used by other agencies to serve as possible models. (e.g., Department of Energy's Environmental Management Advisory Board).
- ★ Identify and initiate action to obtain the resources needed to effectively manage and operate a stakeholder involvement process.

DOD Next Steps on Chapters 1 Through 5

The OEESCM will conduct a formal review of Chapters 1 through 5 of this report and issue a summary of DOD's next steps. For actions that DOD either plans to take or are already underway, it will identify strategies for implementation. DOD will incorporate agreed upon new action items into the MAP to ensure funding and implementation. To the extent that recommendations cannot be fully implemented or implemented at all, DOD will provide a brief explanation of the reasons and its intended actions, if any. A summary of these action items and responses will be prepared and circulated it to the Dialogue members by fall of 2001.

APPENDIX A

NATIONAL POLICY DIALOGUE ON MILITARY MUNITIONS PARTICIPANT LIST

The people listed below participated in the discussions of the National Policy Dialogue on Military Munitions. Being listed as a participant does not signify support of all of the statements and recommendations in the report.

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APPENDIX B

Environmental Justice Public Participation Checklist

The following checklist was developed by the **Department of Defense** from information received from the nineteen federal agencies involved in implementation of Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The checklist was finalized and approved by the Interagency Working Group and the National Environmental Justice Advisory Council.

Revised 1/13/95

1. Ensure that the Agency's public participation policies are consistent with the requirements of the Freedom of Information Act, the Emergency Planning and Community Right to Know Act, and the National Environmental Policy Act.

2. Obtain Senior management Support to ensure that the Agency's policies and activities are modified to ensure early, effective, and meaningful public participation, especially with regard to Environmental Justice stakeholders. Identify internal stakeholders and establish partnering relationships.

3. Use the following Guiding Principles in setting up all public meetings:

- ★ Maintain honesty and integrity throughout the process.
- ★ Recognize community/indigenous knowledge.
- ★ Encourage active community participation.
- ★ Utilize cross-cultural formats and exchanges.
- ★ Identify external Environmental Justice stakeholders and provide opportunities to offer input into decisions that may impact their health, property values, and lifestyles. Consider at a minimum individuals from the following organizations as appropriate:

- Environmental Organizations
- Business and Trade Organizations
- Civic/Public Interest Groups
- Grassroots/Community-based Organizations
- Congress
- Federal Agencies
- Homeowner and Resident Organizations
- International Organizations
- Labor Unions
- Local and State Government
- Media/Press
- Indigenous People
- Tribal Governments
- Industry
- White House

- Religious Groups
 - Universities and Schools
- ★ Identify key individuals who can represent various stakeholder interests. Learn as much as possible about the stakeholders and their concerns through personal consultation, phone, or written contacts. Ensure that information gathering techniques include modifications for minority and low-income communities, for example, consider language/cultural barriers, technical background, literacy, access to respondent, privacy issues, and preferred types of communications.
- ★ Solicit stakeholder involvement early in the policymaking process, beginning in the planning and development stages and continuing through implementation and oversight.
7. Develop co-sponsoring/co-planning relationships with community organizations, providing resources for their needs.
8. Establish a central point of contact within the Federal agency to assist in information dissemination, resolve problems, and to serve as a visible and accessible advocate of the public's right to know about issues that affect health or environment.
9. Regionalize materials to insure cultural sensitivity and relevance. Make information readily accessible (handicap access, Braille, etc.) and understandable. Unabridged documents should be placed in repositories. Executive summaries/fact sheets should be prepared in layman's language. Whenever practicable and appropriate, translate targeted documents for limited English-speaking populations.
10. Make information available in a timely manner. Environmental Justice stakeholders should be viewed as full partners and Agency customers. They should be provided with information at the same time it is submitted for formal review to state, tribal and/or Federal regulatory agencies.
11. Ensure that personnel at all levels in the Agency clearly understand policies for transmitting information to Environmental Justice stakeholders in a timely, accessible, and understandable fashion.
12. Establish site-specific community advisory boards where there is sufficient and sustained interest. To determine whether there is sufficient and sustained interest, at a minimum, review correspondence files, review media coverage, conduct interviews with local community members and advertise in local newspapers. Ensure that the community representation includes all aspects and diversity of the population. Organize a member selection panel. Solicit nominations from the community. Consider providing administrative and technical support to the community advisory board.
13. Schedule meetings and/or public hearings to make them accessible and user-friendly for Environmental Justice stakeholders. Consider time frames that do not conflict with work schedules, rush hours, dinner hours, and other community commitments that may decrease attendance. Consider locations and facilities that are local, convenient, and which represent neutral turf. Ensure that the facility meets the Americans with Disabilities Act Statements for equal access. Provide assistance for hearing impaired individuals. Whenever practical and appropriate provide translators for limited-English speaking communities. Advertise the meeting and its proposed agenda in a timely manner in the print and electronic media. Provide a phone number and/or address for communities to find out about pending meetings, issues, enter concerns, to seek participation, or alter meeting agenda. Create an atmosphere of equal participation (avoid a "panel of experts" or "head table"). A two-

day meeting is suggested with the first day reserved for community planning and education. Organize meetings to provide an open exchange of ideas and enough time to consider issues of community concern. Consider the use of a neutral facilitator who is sensitive and trained in environmental justice issues. Ensure that minutes of the meeting are publicly available. Develop a mechanism to provide communities with feedback after meetings occur on actions being considered.

14. Consider other vehicles to increase participation of Environmental Justice stakeholders including:

- Posters and Exhibits
- Participation in Civic and Community Activities
- Public Database and Bulletin Boards
- Surveys
- Telephone Hotlines
- Training and Education Programs, Workshops, and Materials

15. Be sure that trainers have a good understanding of the subject matter both technical and administrative. The trainers are the Ambassadors of this program. If they do not understand – no one will.

16. Diversity in the workplace: whenever practicable be sure that those individuals that are the decision makers reflect the intent of the Executive Order and come from diverse backgrounds, especially those of a community the agency will have extensive interaction with.

17. After holding a public forum in a community, establish a procedure to follow up with concrete actions to address the communities' concerns. This will help to establish credibility for your agency as having an action role in the federal government.

18. Promote interagency coordination to ensure that the most far reaching aspects of environmental justice are sufficiently addressed in a timely manner. Environmental problems do not occur along departmental lines. Therefore, solutions require many agencies and other stakeholders to work together efficiently and effectively.

19. Educate stakeholders about all aspects of environmental justice (functions, roles, jurisdiction, structure, and enforcement).

20. Ensure that research projects identify environmental justice issues and needs in communities, and how to meet those needs through the responsible agencies.

21. Establish interagency working groups (at all levels) to address and coordinate issues of environmental justice.

22. Provide information to communities about the government's role as it pertains to short term and long term economic and environmental needs and health effects.

23. Train staff to support inter and intra agency coordination, and make them aware of the resources needed for such coordination.

24. Provide agency staff who are trained in cultural, linguistic, and community outreach techniques.

25. Hold workshops, seminars, and other meetings to develop partnerships between agencies, workers, and community groups. (Ensure mechanisms are in place to ensure that partnerships can be implemented via cooperative agreements, etc.).
 26. Provide effective outreach, education and communications. Findings should be shared with community members with an emphasis on being sensitive and respectful to race, ethnicity, gender, language, and culture.
 27. Design and implement education efforts tailored to specific communities and problems. Increase the involvement of ethnic caucuses, religious groups, the press, and legislative staff in resolution of Environmental Justice issues.
 28. Assure active participation of affected communities in the decision making process for outreach, education, training, and communities programs – including representation on advisory councils and review committees.
 29. Encourage federal and state governments to “reinvent government” – overhaul the bureaucratic in favor of community responsiveness.
 30. Link environmental issues to local economic issues to increase level of interest.
 31. Use local businesses for environmental cleanup or other related activities.
 32. Utilize, as appropriate, historically Black Colleges and Universities (HBCU) and Minority Institutes (MI), Hispanic Serving Colleges and Universities (HSCU), and Indian Centers to network and form community links that they can provide.
 33. Utilize, as appropriate, local expertise for technical and science reviews.
 34. Previous to conducting the first agency meeting, form an agenda with the assistance of community and agency representatives.
 35. Provide “open microphone” format during meetings to allow community members to ask questions and identify issues from the community.
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APPENDIX C

Revised Actions for Environmental Justice

**By LeVonne Stone
Director, Fort Ord Environmental Justice Network
Revised July, 2000**

Federal decisions regarding installations, base closures, and proposed reuse disproportionately and negatively affect communities of color, such as African-American, Native-American, Asian-American, and Latino, and low-income communities. In most cases, these communities have been marginalized or barred from the decision-making process. These environmental justice communities must be included and actively engaged in all decisions that affect them.

The record demonstrates that DOD activities have contaminated the environment and closures are having a significant detrimental economic impact, affecting health, well being, the ability to engage in traditional ways of life, the right to live a life free of stress and worry about health and the health of our children, the right to a healthy economy, and the right to engage in economic activities.

Executive Order 12898 on Environmental Justice directs all executive branch agencies/departments to consult with environmental justice communities in all federal actions/decisions that affect such communities.

In support of this, Department of Defense guidance and policy includes environmental justice community representation as an essential element of cleanup activities, especially when an environmental justice community is a stakeholder or potential stakeholder in future land transfers, conveyances and uses.

Consequently, the Final Report of the Federal Facilities Environmental Restoration Dialogue Committee recommends environmental justice community representation, where applicable.

Despite these policies and guidance, The Department of Defense has not been accountable to environmental justice communities for the disproportionate impact of pollution and economic decisions on their communities, and has refused to take ownership of these impacts as well.

Many Environmental Justice communities continue to experience adverse health effects from remnant pollution resulting from military activities on bases.

Therefore, Environmental Justice communities must have enhanced opportunities to engage in proposed cleanup activities and become partners in

decisions made by the military that affect them so profoundly. Also, hiring practices of National Environmental groups need to reflect representation from the affected communities.

Government and state regulators and law enforcement officials must improve the weak enforcement of environmental law in affected communities, including cleanup levels and reuse/redevelopment decisions.

The federal government has been ineffective in developing a sustainable plan or strategy to mitigate the disproportionate economic impact that environmental justice communities experience. In addition, contract awards and job opportunities have gone to non-local, non-affected contractors, businesses, and workers.

Recommendations

We recommend that the U.S. Environmental Protection Agency (EPA) and DOD provide resources to environmental justice communities to educate these communities on issues surrounding base cleanups, conduct independent testing and analysis, and to allow the means to influence outcomes.

We recommend that the EPA and DOD establish a program to provide resources for assistance in economic development targeted to the affected communities adjacent to the sites that include people of color, and representatives of environmental groups.

In areas where there is a threat of exposure to remnant contaminants, DOD must establish specialized environmental health clinics accessible to potentially affected citizens.

There must be programs and strategies for community based economic benefit, such as community land banking, set-asides, and financial and technical assistance that will strengthen and help build on the inherent cultural and historical strengths of impacted populations.

We further recommend that there be an Environmental Justice Ombudsman (Community Representative) to oversee actions regarding economic development on a site-specific basis that will adequately represent people of color and Environmental Justice groups in partnerships and in hiring practices in their respective communities and beyond.

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