

Transferring Army BRAC Lands Containing Unexploded Ordnance

Lessons Learned and Future Options

Jacqueline MacDonald

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Preface

The Department of Defense is now in the planning stages of the fifth round of Base Realignment and Closure (BRAC) actions, known as BRAC 2005. The Army, along with the other services, is initiating its screening process to identify installations for possible realignment or closure. In the previous four rounds, the BRAC process has partially succeeded—albeit slowly—in transferring most lands on installations slated for disposal. However, lands containing unexploded ordnance left over from military training have proved particularly difficult and costly to transfer, and, with a few exceptions, little progress has been made.

RAND Arroyo Center was asked by the Assistant Chief of Staff for Installation Management to undertake two tasks: (1) identify and assess obstacles to disposing of excess Army lands that contain unexploded ordnance, and (2) identify innovative options for the disposal of these lands. Using a case study approach and a survey of individuals associated with selected BRAC installations contaminated with unexploded ordnance, Arroyo explored the probable sources of delay as well as sources of support in transferring land containing unexploded ordnance. We then considered actions the Army could take to overcome barriers to transfer. We also considered several alternative organizational approaches to dealing with these lands, based on our own findings and other published assessments. It is important to note that these data are current through May 2003. Additional land transfers have been executed by the Army BRAC office subsequent to that date.

This research was carried out in RAND Arroyo Center's Military Logistics program. RAND Arroyo Center, part of the RAND Corporation, is a federally funded research and development center sponsored by the United States Army.

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Summary

Beginning in 1988, Congress has periodically directed the Department of Defense (DoD) to undertake the realignment or closure of installations no longer needed to fulfill mission requirements. DoD's four legislated rounds of Base Realignment and Closure (BRAC) actions in 1988, 1991, 1993, and 1995 resulted in the closure of 97 major DoD installations and many smaller ones. As prescribed by the BRAC legislation, DoD must transfer the closed installations to other federal, state, or local agencies, or to private entities. These closures notwithstanding, DoD estimates that it still has 23 percent more base capacity than it needs, and maintaining this excess capacity requires funds that could otherwise be spent on more critical mission needs. In response to a DoD request, Congress authorized another round of base closures to begin in 2005.

The General Accounting Office (GAO) estimated in 2002 that 58 percent of lands previously designated for transfer remain in the DoD inventory (U.S. GAO, 2002). (Additional lands have transferred since the GAO's survey.) According to the GAO, "[t]he primary impediment to transferring the remaining property involves environmental cleanup, which could take many more years to complete . . ." (U.S. GAO, 2002).¹ Environmental issues to be dealt with at BRAC properties include chemical contaminants in soil and

¹ While the GAO uses the term "cleanup," the DoD's preferred term is "environmental response."

groundwater and unexploded ordnance (UXO), both of which are consequences of extensive military training and weapons testing. This report focuses specifically on the effect of UXO on the land transfer process.²

While all military services have BRAC land containing UXO, Army sites account for 94 percent of the estimated cost to complete UXO remediation at BRAC installations (DoD, 2003). Of about 90,000 acres of UXO-containing Army lands available for transfer in prior BRAC rounds, only about 9,000 (10 percent) have actually been transferred outside DoD. Thus, as the Army approaches a new round of base closures in 2005, identifying the specific barriers inhibiting the transfer of land containing UXO might enable it to devise new strategies. These could include eliminating some of these lands from the BRAC program entirely, selectively constraining response actions and reuse options early in the BRAC process, or expediting administrative elements of transfer procedures and negotiations. This report focuses primarily on the latter two options; analysis of the first option was beyond the scope of this study.

Purpose and Methods

This report identifies factors that have facilitated or hindered the transfer of land containing UXO in the past and recommends how the land transfer process might be modified so that it better meets the goals of the BRAC program to save costs through land transfers. To identify these factors, we employed a three-step methodology. First,

² Unexploded ordnance are military munitions that have been primed, fuzed, armed, or otherwise prepared for action; that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and that remain unexploded by malfunction, design, or any other cause. UXO includes explosive warheads, rocket motors, practice munitions with spotting charges, torpedoes, artillery and mortar ammunition, grenades, incendiary munitions, electro-explosive devices, and propellant-actuated devices. UXO is now classified as the "fired" type of munitions and explosives of concern (MEC), which are military munitions that pose an explosive safety risk. (From the "Former Fort Ord Environmental Cleanup" website, <http://www.fortordcleanup.com/cleanuppgrm/oeprogram.asp>, accessed November 23, 2004.)

we gathered data on Army BRAC installations to determine what land transfers have occurred. We acquired data on 26 installations, which account for 82 percent of the acreage in the Army's land inventory from the four previous BRAC rounds. Transfers from these installations included land with and without UXO. Data are current through May 2003.

Second, we identified nine installations (seven where UXO transfers had occurred and two where they had not) and conducted case studies using structured interviews with individuals who were knowledgeable about the transfer process. The interviews included installation officials, representatives from the Environmental Protection Agency, state regulators, and individuals directly involved with local redevelopment authorities. Our interview group did not include private developers. The case studies helped us to identify factors that enhanced or hindered land transfers from the perspectives of these individuals. Based on these discussions, we generated a list of eight factors that might exert the most influence on UXO land transfers.

Third, we conducted a formal survey of 26 individuals at 10 of the 26 installations to more systematically identify key factors affecting the transfer process. Respondents were classified as base personnel, regulators, or community leaders. We asked each survey respondent whether the identified factors had facilitated, slowed, prevented, or had no effect on the transfer of land at their installation. We also asked whether there were other influential factors not on our list. The factors evaluated in the survey were as follows:

- availability of funding for UXO clearance;
- existence or lack of clear and concise information about the amount, locations, and types of UXO present;
- existence or lack of clear standards for UXO response;
- existence or lack of standard DoD operating procedures for UXO response;
- land receiver's perceptions of potential liability resulting from UXO;
- public perception of risk from UXO;
- environmental regulators' positions about risk from UXO; and

- state of knowledge of effectiveness of UXO detection instruments.

Findings

The Army has made substantial progress in transferring land without UXO and very little progress in transferring land with UXO. About 61 percent of the acreage of BRAC land without UXO has been transferred to organizations outside the Army, including transfers to other federal agencies. In our database of 26 installations, nearly all of the non-UXO acreage from the 1988 BRAC round, 79 percent from the 1991 BRAC round, 88 percent from the 1993 BRAC round, and 58 percent from the 1995 BRAC round has been transferred.

As previously noted, only 10 percent of the land containing UXO has transferred.³ Nearly all of the transfers occurred under special circumstances. In the case of the Presidio in San Francisco, the land was conveyed before it was known that UXO was present. In the case of Fort Meade, Maryland, 8,470 acres of UXO-containing land were transferred by an act of Congress. This transfer alone accounts for 91 percent of the total UXO acreage transferred. In only two cases, Fort Sheridan, Illinois, and Fort Devens, Massachusetts, did significant parcels of land known to contain UXO transfer using conventional conveyance procedures. We note again that these analyzed data are current through May 2003. Additional land transfers have been executed by the Army BRAC office subsequent to that date.

Factors Facilitating Transfer

Although very little UXO-contaminated land has passed out of the Army's control, our case studies showed that the installations that did successfully transfer such land share the following features:

³ Leased lands are not counted as transferred properties in the research conducted by RAND Arroyo Center. Although leased properties may defray some of the Army's operation and maintenance costs for the land, the Army still holds the deed to it.

- density of UXO was low;
- land was transferred to only a few recipients;
- financial incentives for transfer were strong; and
- the Army's UXO removal process proceeded with minimal regulatory intervention and oversight.

Factors Slowing Transfer

Interviewees in the case studies and respondents to our survey cited multiple factors as causes of delay. The leading factors were the following:

- lack of information about UXO locations, quantities, and types before land-reuse decisions were made;
- inability of detection technologies to ensure that all UXO items have been located and removed;
- lack of established standards for UXO cleanup; and
- inability to meet regulators' requirements for reducing risk from UXO.

It is important to note that the survey centered on factors affecting land transfers that specifically related to UXO. We did not pursue questions related to the presence of munitions constituents, other environmental contaminants, or other nonenvironmental issues, although these points were raised by respondents when we asked them to identify other factors affecting the transfer process at their installation.

Alternative Approaches for Transferring Land with UXO

The Army has taken action to address some of the factors that have slowed UXO land transfer. For example, in response to a congressional mandate to improve the information base on which UXO decisions are made, the Army is developing an inventory of all closed, transferred, and transferring training ranges where ordnance may have been used. In addition, the Army recently began the develop-

ment of a database of UXO characteristics on Army lands, the Army Environmental Database–Restoration (AEDB-R). More actions will be needed to improve decisionmaking related to UXO-containing lands.

Evidence to date shows that when UXO is present, the Army's efforts to transfer land have been problematic. Even with the availability of multiple land transfer mechanisms like public benefit conveyance, early transfer authority, and economic development conveyance, the evidence suggests that the transfer process for land containing UXO is not advancing and that the Army is not meeting its BRAC objectives on those lands. It is still too soon to tell whether the newly authorized conservation conveyance mechanism, in which nongovernmental entities can accept title to ecologically valuable lands, will change the success rate for UXO land transfers.

Additional administrative changes by the Army, more aggressive use of early transfer authority, and promotion of conservation conveyances might help to speed transfers of BRAC lands containing UXO. However, it is difficult to know *a priori* how much effect these incremental changes would have. Organizational changes could potentially make it easier for the Army to extract greater benefits from existing administrative tools. For example, the Army could assemble within headquarters a team of experts in real estate transactions and development in the BRAC process to provide a critical mass of technical support to installation managers and provide more consistency across the organization.

There may also be merit in exploring a more significant alternative organizational concept: the establishment of a federal government corporation (FGC) whose sole responsibility would be to transfer BRAC lands (both with and without UXO) more expeditiously and efficiently than the Army and other services have done to date. Such entities have been created in the past to deal with complex problems requiring special expertise not typically found in the government. The Resolution Trust Corporation, for example, was created to deal with the savings and loan crisis. Its charter enabled it to gather people with the expertise necessary to manage a host of assets and liabilities of varying character and dispose of them efficiently and

effectively, using market tools not available to the government. When its work was done, it ceased to exist. Congress would have to establish an FGC for land disposition and fund its operations. Further analysis would be needed to determine the appropriate structure, organizational goals, incentives, and oversight mechanisms to create an effective FGC for this purpose.

Recommendations

As the Army moves toward BRAC 2005, it should consider the following recommendations to overcome barriers to the transfer of existing UXO-containing BRAC land and the prospective transfer of new BRAC UXO lands:

- Make incremental changes to current Army procedures, including: improving characterization of UXO occurrence on BRAC lands before decisions about reuse; clarifying UXO clearance protocols; and improving cost/risk estimation procedures. Improving information about UXO occurrence lies on the critical path of virtually every other action.
- Explore an alternative management approach that would unify and integrate expertise and guidance on the land-disposal process within Army headquarters. This approach has the potential to lower the Army's transaction costs and lead to higher cost savings than the current approach, which is more reliant upon expertise existing at the installation level. To this end, a comparative study should be conducted on the Army, Navy, and Air Force BRAC offices to ascertain whether a more centralized approach in practice leads to improved cost savings and higher transfer rates for UXO land.
- Take the lead in working with the other services and the Office of the Secretary of Defense to conduct an in-depth study of the concept of a federal government corporation that would handle all transfers of excess DoD lands—with and without UXO—from former and future BRAC rounds.

- Specifically for the BRAC 2005 selection process, establish procedures to ascertain the value of acquiring additional information about environmental contamination and UXO at candidate installations. Some of these installations might be prime candidates for conservation conveyance transfers rather than other reuse options. Such knowledge upfront could lead to higher cost savings and faster transfers.

These recommendations could have immediate effects on the ongoing BRAC land transfers from the previous rounds. Further, implementing and evaluating their impacts on the current land inventory would strengthen the Army's position to implement BRAC 2005.

Acknowledgments

The authors would like to thank our project sponsor, Colonel Douglas Baker, chief of the Army BRAC Office, for his support and that of his staff. In particular, Ricky Stauber provided us with valuable background information on the Army BRAC program, helped us acquire information about the relevant installations, and facilitated our efforts to contact base personnel in the conduct of our survey. Lucy Liew and Kim Stewart also provided valuable information and insights about ongoing land transfer efforts.

In our survey and in interviews for our case studies, we spoke with many Army personnel, staff of the Environmental Protection Agency, and citizens involved in the BRAC process in their communities. While too numerous to mention here by name, we are grateful to all of them for their cooperation, responsiveness, and willingness to share their experiences and insights with us.

Rebecca Rubin, President and Managing Partner of Marstel-Day LLC, reviewed an earlier draft of this report and has been extraordinarily helpful in bringing information and insights to our efforts. Harry Zimmerman, also with Marstel-Day, helped us better understand the dynamics of the Navy BRAC land transfer process. Jerry Kohns, an attorney with the Navy's Office of General Counsel, helped us understand the general outlines of the Navy's BRAC process. Barry Steinberg, former head of the Army Environmental Law Division, also lent his insights. We further benefited from the prior work and insights of our RAND colleague Ellen Pint, who also served

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Abbreviations

| | |
|--------|--|
| ADEM | Alabama Department of Environmental Management |
| AEDB-R | Army Environmental Database–Restoration |
| ARID | Army Range Inventory Database |
| ASR | Archives search report |
| BCT | BRAC cleanup team |
| BRAC | Base Realignment and Closure |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CTT | Closed, transferring, and transferred |
| DLTC | Defense Land Trust Corporation |
| DoD | Department of Defense |
| DOE | Department of Energy |
| DU | Depleted uranium |
| EPA | Environmental Protection Agency |
| ESCA | Environmental Services Cooperative Agreement |
| ETA | Early transfer authority |
| FGC | Federal government corporation |
| FORA | Fort Ord Reuse Authority |
| FORG | Fort Ord Reuse Group |
| FOSL | Finding of suitability to lease |
| FOST | Finding of suitability to transfer |

| | |
|-------|--|
| GAO | General Accounting Office |
| IDA | Institute for Defense Analyses |
| JPA | Joint Powers Authority |
| JPG | Jefferson Proving Ground |
| LRA | Local reuse authority |
| MITC | Military Intelligence Training Center |
| MOA | Memorandum of agreement |
| MOU | Memorandum of understanding |
| NRC | Nuclear Regulatory Commission |
| OE | Ordnance and explosives |
| OERIA | Ordnance and Explosives Risk Impact Assessment |
| RAB | Restoration Advisory Board |
| RTC | Resolution Trust Corporation |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| UXO | Unexploded ordnance |

Introduction

The leadership of the Department of Defense (DoD) has long contended that DoD's infrastructure remains mismatched to the size and structure of today's armed forces, even after four rounds of base realignment and closure (BRAC) that occurred in 1988, 1991, 1993, and 1995. The DoD estimates that it has 23 percent more base capacity than it needs, despite the base closures that have already occurred (DoD, 1998). Therefore, as a result of requests from DoD leadership, Congress in 2001 authorized the closure of additional military bases beginning in 2005 (National Defense Authorization Act of 2002, Public Law 107-107).

Without doubt, the base closures that have occurred since 1988 have saved money. The DoD has estimated that annual recurring savings from the four BRAC rounds are about \$6 billion per year and that total recurring savings through fiscal year 2003 are about \$25 billion (DoD, 1998). The U.S. General Accounting Office (GAO) has confirmed these estimates (U.S. GAO, 2002).

Past BRAC-associated savings notwithstanding, additional closures and realignments of military bases are needed, DoD contends, to provide funds to maintain readiness and invest in new defense technology. As one observer writing in an Army logistics journal noted, "Unless [the DoD's] infrastructure is reduced proportionately, the tail will swallow the teeth of our armed services" (James, 2000).

Yet even as the DoD leadership formulates plans for these new closures, more than half the available lands at installations that were closed under the previous BRAC rounds have not been transferred

2 Transferring Army BRAC Lands Containing Unexploded Ordnance

outside of DoD. The GAO has monitored the status of BRAC since the first round of closures began in 1988. According to a 2002 GAO review, some 58 percent of DoD BRAC land remained to be transferred, even though all the affected bases have been deactivated (U.S. GAO, 2002).

The primary reason for the delay in transfers is the presence of unexploded ordnance (UXO) and other environmental contamination. UXO is left over from weapons training and testing activities. According to the GAO, "Our analysis of former bases with untransferred acreage and our discussions with military service officials show that, while there are several reasons for delays in transferring property to other users . . . environmental cleanup-related issues are predominant" (U.S. GAO, 2002). At these residual sites, the DoD retains the burden of maintaining the land and facilities as well as substantial liability for UXO clearance and other response actions. As discussed in Chapter Three, in our own structured interviews with Army officials as well as regulators and community representatives, the lack of reliable UXO information and an imperfect ability to pinpoint UXO locations were often cited as barriers to transferring land outside of the military.

The cost of clearing UXO diminishes the expected savings from base closures unless those costs are accurately factored into the expected savings estimated during the planning phase of a BRAC round. The extent to which UXO clearance costs will cut into these savings is difficult to estimate with any precision because of uncertainties about UXO density, type, and required depth of clearance. The DoD has estimated that the costs of completing UXO clearance at all closed, transferred, or transferring installations (BRAC installations as well as those sites known as Formerly Used Defense Sites [FUDS] closed before BRAC) could range from \$8 billion to \$21 billion (DoD, 2003). Previous reviews by GAO and others have indicated that these cost estimates are significantly understated and that the true costs could range up to \$100 billion (U.S. GAO, 2001).

Some of the uncertainty in costs can be attributed to the absence of a more refined cost estimation tool.¹

The experiences during previous BRAC rounds with UXO-contaminated land provide important lessons to consider as the DoD plans for additional base closures. This is a particularly salient issue for the Army. Army sites account for 94 percent of the estimated cost to complete UXO remediation at all BRAC installations (DoD, 2003). Understanding why UXO land is difficult to transfer via standard operating procedures could lead to greater cost savings for the Army in the future. Every year a closed base is not transferred outside of the Army leads to additional costs to the Army to maintain personnel, facilities, and property. Delays in transfer further constrain or prevent the reuse of the land for economic development or conservation purposes, adding costs to surrounding communities.

The following section describes the process involved in selecting bases for closure and transferring the land outside of DoD.

BRAC Selection Process

Questions about the amount of UXO-containing land transferred and the length of time required for these transfers are important because they reflect, in part, the success of the closure process. Financial analyses demonstrate that BRAC has created significant cost savings for DoD. However, the independent commission appointed to recommend military bases for closure recognized throughout the BRAC process that the communities bordering the closing installations would bear an economic burden. The BRAC Commission intended to minimize the detrimental economic impact on these communities. In its report to Congress, the commission wrote, "The Federal government has an obligation to assist local communities in the challenge

¹ The Army uses a cost estimation tool called Remedial Action Cost Engineering Requirements, or RACER. RACER was not designed to account for factors such as soil type and depth of excavation relevant to remedial actions. (Mendez, Wu, et al., 2002.)

of replacing the base in the local economy” (Defense Base Closure and Realignment Commission, 1995). Transitioning former base land to civilian uses is critical for economic redevelopment, and evidence gathered for this study suggests that UXO contamination has interfered with this aspect of BRAC. Delays in UXO clearance and land transfer hinder local redevelopment efforts and consequently the rebuilding of the local economy.

Box 1.1 lists the criteria used to select installations for closure or realignment under the four previous BRAC rounds (Defense Base Closure and Realignment Commission, 1995). Each armed service generated its own list of recommended closures, taking into account the criteria shown in Box 1.1.² The specially appointed BRAC Commission considered the services’ recommendations and generated a list of bases for closure. This list was sent to the President for his approval. Congress was also given the opportunity to accept or reject the entire list.

To select closure candidates in previous BRAC rounds, the Army first grouped its major installations into categories reflecting their primary missions (training, maneuver, education, ammunition storage, and so on) (Hix, 2001). Within each mission area, the Army ranked installations according to military value using the first four criteria shown in Box 1.1. The Army then evaluated the lowest-ranked installations according to the last four criteria (costs and savings, economic effect on communities, ability of communities to sustain a military base, and environmental impact). Thus, the military value (both operational and financial) of each installation was the foremost consideration, but as mandated by the BRAC Commission, the Army also considered the potential effects of base closures on communities.

² The seventh criterion requires consideration of the effect on the community that receives the units displaced from the BRAC installation as well as the community affected by the closure.

Box 1.1**BRAC Selection Criteria****Military Value**

1. The current and future mission requirements and the impact on operational readiness of the Department of Defense's total force.
2. The availability and condition of land, facilities, and associated airspace at both existing and potential receiving locations.
3. The ability to accommodate contingency, mobilization, and future total force requirements at both existing and potential receiving locations.
4. The cost and manpower implications.

Return on Investment

5. The extent and timing of potential costs and savings, including the number of years, beginning with the date of completion of the closure or realignment, for the savings to exceed the costs.

Community Impacts

6. The economic effect on communities.
7. The ability of both the existing and potential receiving communities' infrastructure to support forces, missions, and personnel.
8. The environmental impact.

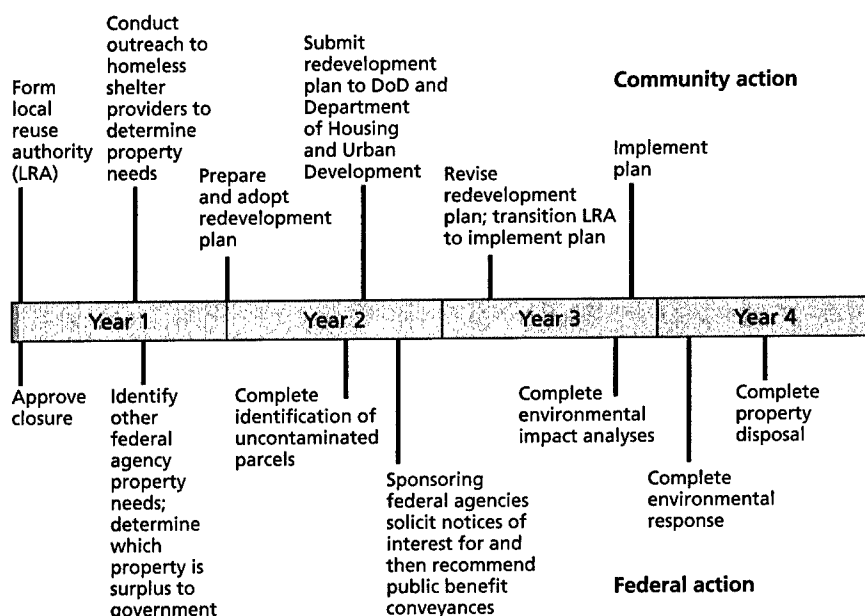
Source: Defense Base Closure and Realignment Commission (1995).

Current Army Process for Transferring Land

The current Army process for transferring land to subsequent users involves many steps. An outline of these procedures is shown in Figure 1.1. As indicated in the figure, the Army finds itself engaged with many diverse interests with a stake in the future use of the land, including:

- local reuse authorities (LRAs),

Figure 1.1
The BRAC Property Disposal Process, as Designed



RAND MG199-1.1

SOURCE: Adapted from the *DoD Base Reuse Implementation Manual* (DoD 1995).

- private developers who have purchased or may wish to purchase base property (either through the LRA or directly from the Army if the LRA reuse plan is not approved),
- other federal government agencies,
- recipients of public benefit conveyances,
- federal and state natural resource and environmental authorities, and
- local communities.

Army officials dealing with base closures develop relationships with the contractors who will conduct any necessary clearance activities. BRAC installation staff also work with other Army offices and

agencies, such as the Army Corps of Engineers, who typically conduct site surveys, historical use searches, and quality control of clearance activities. Some of these relationships take the form of formal business contracts, while others are of an informal cooperative or advisory nature. Figure 1.1 outlines a process designed to take four years; as our study reveals, past transfers involving UXO typically take much longer.

One source of delay is environmental response actions, shown in Figure 1.1 to be completed by the fourth year of the transfer process. Federal facilities and lands designated for disposal must comply with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Under CERCLA, federal agencies are required to conduct response actions if hazardous substances, pollutants, or contaminants have been released, disposed of, or stored on site. CERCLA requires that before transfer, the transferring party verify that the land conditions are stable and pose no threat to human health and the environment. Under the original BRAC legislation, this meant that the military departments would be required to complete all response actions before DoD could enter into transfer agreements. These requirements can be time consuming, with no guarantee that the benefits to the public, the environment, the community, or DoD are commensurate with costs. In 1996, Congress authorized a waiver of CERCLA requirements for federal facilities in what is known as early transfer authority. ETA authorizes that all remedial actions required prior to transfer of federal property can be deferred, allowing deed transfers to occur before the completion of necessary remediation. (This mechanism is discussed in more detail in Chapter Four.)

Other studies have examined the effectiveness of the BRAC process illustrated in Figure 1.1—apart from the particular circumstances of UXO occurrence—and have identified opportunities for improvement (Rubin, 2001). However, our study focuses specifically on the Army's experience to date with the transfer of BRAC land containing UXO.

Liability Issues Associated with UXO

Receiving entities are cautious about accepting BRAC sites because of potential liability issues, especially if the presence of UXO is suspected. The Army typically uses two approaches to identify UXO on BRAC land. First, Army personnel complete "archives search reports" (ASRs), which inform the characterization of risk by identifying the activities that occurred on the base. However, many sites are old and lack adequate documentation of historical activities.

Second, once areas suspected of containing UXO have been identified, the Army typically employs metal detectors to locate UXO. If any UXO is found, it is usually removed to a depth of a certain number of feet as determined by reuse plans. Unfortunately, the ability of detection technologies currently in use to discriminate between UXO and non-UXO anomalies is far from adequate (MacDonald, Knopman, et al., 2004). The difficulty in identifying and removing UXO is a serious problem that has profound consequences on the land transfer process when UXO is present.

Under section 120(h)(3) of CERCLA, the federal government must clean up any contamination that can be attributed to DoD activities discovered after the property is transferred. Section 330 of the National Defense Authorization Act for FY1993 provides some indemnification to transferees and lessees of BRAC land from legal action for releases or threatened releases of hazardous substances resulting from DoD activities (DoD, 2001). Even with these protections provided by law, a perception continues among some potential transferees and lessees that the acceptance of BRAC land, especially land suspected of containing UXO, is a high-risk venture.

Potential transferees can further protect themselves against future liability and assist in attracting financing for redevelopment investment by buying environmental insurance. Environmental insurance can cover cleanup cost overruns, tort liabilities, discovery of new contamination, and any work stoppage that may result from such a discovery. The availability of insurance helps the LRA or developer manage the potential legal, financial, and environmental risks associated with a former military site. Although some insurance policies

may specifically exclude UXO in their coverage, this provision can be negotiated between the LRA or developer and the insurance company.

How This Report Is Organized

The Assistant Chief of Staff for Installation Management asked RAND Arroyo Center to identify improved processes for selecting and managing disposition of UXO areas in BRAC in the future, based on experiences from BRAC I–IV. Arroyo’s two tasks were to (1) assess barriers to transfer of UXO-containing lands and (2) consider options to improve the transfer process for future BRAC rounds. This report describes our analysis of the Army’s experience with UXO lands from previous BRAC rounds. We used case studies and a survey to assess the key factors affecting the success—or lack thereof—and timing of disposition of UXO-containing lands. This report also explores actions and alternative approaches that the Army could take to improve the efficiency and effectiveness of the BRAC process as it relates specifically to the disposition of UXO-containing lands.

Chapter Two presents data gathered by Arroyo on the transfer status of Army BRAC land containing UXO and describes our findings from case studies at installations where some UXO land has transferred. Chapter Three describes our findings from a survey of 26 individuals at 10 installations in which we evaluated the importance of factors that may have affected the UXO land transfer process—whether positively or negatively. Chapter Four considers options for improving the UXO land transfer process, both for sites currently in the BRAC inventory and prospectively for installations in BRAC 2005. In Chapter Five, we summarize our findings, conclusions, and recommendations to the Army for future action. Appendix A contains the land transfer data for several installations. Appendix B provides additional discussion about how a federal government corporation could handle all BRAC land transfer transactions in place of DoD. Appendix C reproduces the instrument we used to conduct our

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survey of individuals knowledgeable about the transfer process. Appendixes D through L present brief narratives on the UXO land transfer process at nine selected installations.

Fate of Army UXO Land from Previous BRAC Rounds

Our early discussions in 2002 with Army personnel and other individuals involved in the BRAC process suggested that little UXO-containing land on BRAC installations had been successfully cleared and transferred outside of DoD. Yet, when we commenced our study, we could find no previous analysis summarizing how much UXO-containing land the Army had in its BRAC inventory and how much of it had actually been transferred. Therefore, we collected data and conducted case studies to obtain the information necessary to determine the scope of the UXO problem and followed with a survey to better understand the relative importance of various factors in the land transfer process.

Our data-gathering exercise was intended to answer the following questions:

- How much Army BRAC land containing UXO has been transferred outside of DoD?
- By comparison, how much Army BRAC land free of UXO has been transferred?
- How many years after BRAC selection, on average, are required to transfer land containing UXO? How does this compare with the number of years required to transfer land without UXO?
- Are there any examples of successful UXO land transfer that might serve as models for the future?

This chapter reports the results of our data analysis and case studies. (Chapter Three summarizes the findings from our survey.)

Our analysis shows that the transfer of UXO land continues to pose a challenge for the Army. No clear road map has yet emerged that the Army BRAC staff can apply either program-wide or at individual installations to make the transfer process more effective and efficient for UXO-containing lands.

Transfer Status of Army BRAC Land

We evaluated the transfer status of Army BRAC land with and without UXO at 26 major Army BRAC installations containing 159,000 (82 percent) of the Army's 195,000 closed, transferring, and transferred acres under the four previous BRAC rounds. Our primary purpose was to assess the extent to which land containing UXO has been cleared and returned to the community. We wanted to compare the results of closure of UXO-contaminated areas to those without UXO.

Table 2.1 lists the installations included in our analysis. The list of installations was taken from a 1997 GAO evaluation of lessons learned from BRAC (U.S. GAO, 1997), with Fort Meade added. This list does not include all Army BRAC installations. According to the Army BRAC Office, 112 Army installations have been realigned or closed under the four BRAC rounds (see <http://www.hqda.army.mil/acsimweb/brac/braco.htm>). Nonetheless, the list includes most of the major Army installations with significant surplus land, according to the GAO (which reports that it obtained the information from DoD) (U.S. GAO, 1997). For each installation, we collected the data shown in Table 2.1 as well as a listing of parcels of land containing UXO that have been transferred to non-DoD organizations, a listing of parcels without UXO that have been transferred, and the transfer dates for each parcel. We obtained the data from a variety of sources, including

- archives search reports (ASRs), which document historical information on the use of ordnance at a specific installation;

- closed, transferring, and transferred (CTT) range and site inventory reports, which are being developed for installations included in a new database of all UXO sites;
- “no range findings” memoranda, which document that no UXO is present at installations formerly suspected of containing UXO;
- installation web pages;
- Department of Defense Environmental Restoration Program annual reports to Congress;
- BRAC cleanup plan abstracts; and
- EPA’s database of sites being cleaned up under CERCLA.

We also spoke to installation representatives to confirm the data on land transfers and to provide data that were unavailable from other sources. Appendix A contains the complete data collected for each installation. Note that our data are current as of May 2003. Subsequent to that date, the Army has transferred additional land.

Estimates of UXO acreage are constantly changing as new information is collected. In many cases, data in previous written reports do not match information we obtained directly from installation BRAC offices. This is because defining which areas are affected by UXO and which are free of UXO can be difficult. Some installation personnel told us that the Army Corps of Engineers was conservative (i.e., overinclusive) in delineating range fans (the areas surrounding training ranges where UXO may have landed). Also, not all UXO items are equally hazardous. For example, small-arms ammunition generally does not pose the same magnitude of hazard as larger ordnance, and some installation personnel with whom we spoke did not regard small-arms ranges as UXO sites. In other cases, UXO has been discovered in areas thought to be free of ordnance, or larger ordnance items have been found in areas thought to have been used only for small-arms training. For example, at the Presidio of San Francisco, Civil War-era shells were found after the installation had been declared free of all UXO other than small-arms ammunition (see

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Table 2.1
Installations Included in This Analysis

| Installation | BRAC Date | Closure Date | Total BRAC Acres | Closed Acres Available for Transfer | UXO Acres Available for Transfer |
|------------------------------------|------------|--------------|------------------|-------------------------------------|----------------------------------|
| Army Research Laboratory—Watertown | 1988 | 1994 | 48 | 48 | 0 |
| Bayonne Military Ocean Terminal | 1995 | 1999 | 679 | 679 | 0 |
| Cameron Station | 1988 | 1995 | 164 | 164 | 0 |
| Fitzsimons Army Medical Center | 1995 | 1999 | 579 | 557 | 0 |
| Fort Benjamin Harrison | 1991 | 1995 | 2,501 | 2,370 | 0 |
| Fort Chaffee | 1995 | 1997 | 71,758 | 7,030 | 0 |
| Fort Des Moines | 1988 | 1994 | 83 | 50 | 0 |
| Fort Devens | 1991 | 1996 | 9,300 | 4,120 | 623 |
| Fort Dix | 1995 | 1997 | 32,000 | 224 | 12 |
| Fort Douglas | 1988 | 1991 | 68 | 51 | 0 |
| Fort Meade | 1988 | 1995 | 13,309 | 8,470 | 8,470 |
| Fort Holabird | 1988, 1995 | 1996 | 21 | 21 | 0 |
| Fort Indiantown Gap | 1995 | 1998 | 19,200 | 2,500 | 0 |
| Fort McClellan | 1995 | 1999 | 41,174 | 18,619 | 5,818 |
| Fort Ord | 1991 | 1994 | 28,000 | 28,000 | 12,000 |
| Fort Pickett | 1995 | 1998 | 45,160 | 2,863 | 0 |
| Fort Ritchie | 1995 | 1998 | 615 | 591 | 364 |
| Fort Sheridan | 1988 | 1993 | 712 | 406 | 86 |
| Jefferson Proving Ground | 1988 | 1995 | 55,264 | 55,264 | 53,494 |
| Lexington Facility | 1988 | 1995 | 788 | 788 | 0 |
| Oakland Army Base | 1995 | 1999 | 426 | 400 | 0 |
| Presidio of San Francisco | 1988, 1993 | 1994 | 1,480 | 1,480 | 17 |
| Sacramento Army Depot | 1991 | 1995 | 487 | 406 | 0 |
| Savanna Army Depot | 1995 | 2000 | 13,062 | 13,062 | 5,590 |
| Seneca Army Depot | 1995 | 2000 | 10,594 | 10,594 | 3,255 |
| Vint Hill Farms Station | 1993 | 1997 | 701 | 701 | 0 |
| TOTALS | | | 348,173 | 159,459 | 89,729 |

Appendix K for more details). Explosive ordnance disposal crews had to be brought in to retrieve and dispose of the shells.

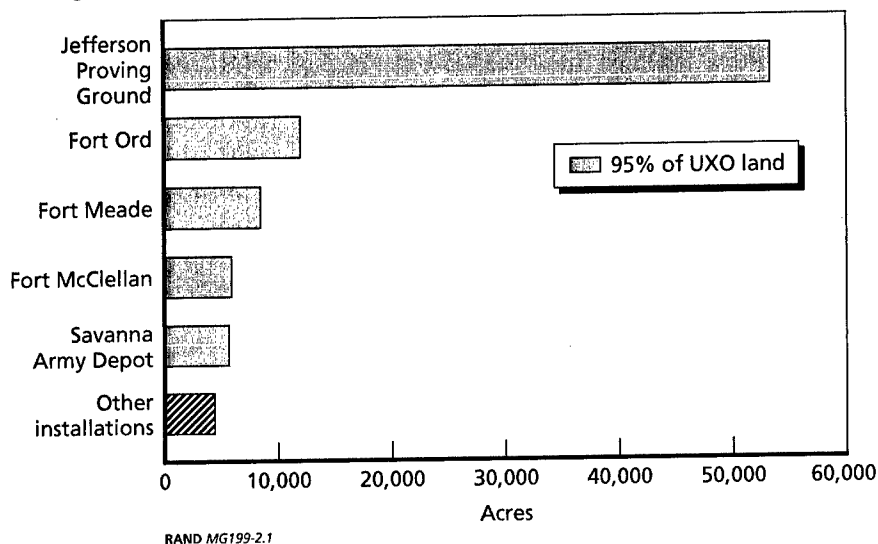
For this study, where data conflicted, we used the information provided by the installation BRAC offices as the basis for our analysis. We included small-arms ranges in the totals because, although small arms are the least dangerous category of UXO, they can still be hazardous, and some small-arms ranges have been found to contain larger ordnance. We excluded the 56,372 acres of Lake Michigan off the coast of Fort Sheridan that the Army used as target practice between 1930 and 1959 because our focus was on land redevelopment. Also, no plans are being made to clean up this submerged ordnance (URS Group, 2002).

Amount of Army BRAC Acreage Affected by UXO

Figure 2.1 summarizes the data on UXO acreage on closed portions of the 26 installations. More than half (57 percent) of the total acreage slated for transfer is affected by UXO. However, as shown, 95 percent of the UXO acreage is concentrated at just five bases: Jefferson Proving Ground, Fort Ord, Fort Meade, Fort McClellan, and Savanna Army Depot. Just one of these installations, Jefferson Proving Ground, contains 60 percent of the UXO acreage, primarily due to the fact that it was an ammunition testing site.

As a result of the 1988 BRAC round, Jefferson Proving Ground was closed, and all the land was to be transferred (see Appendix J). Nearly all of the UXO-affected acres (about 50,000 of a total of about 53,000 acres) were slated for transfer to the U.S. Fish and Wildlife Service for use as a wildlife refuge. However, after the Army determined that cleaning up UXO on this land was infeasible with current technology due to the high density of ordnance, the Fish and Wildlife Service rescinded its offer to assume responsibility for the land. Instead, the Army continues to maintain ownership, while the Fish and Wildlife Service manages the natural resources in what is known as a refuge "overlay."

Figure 2.1
Acreage Affected by UXO at the 26 Installations Included in Table 2.1

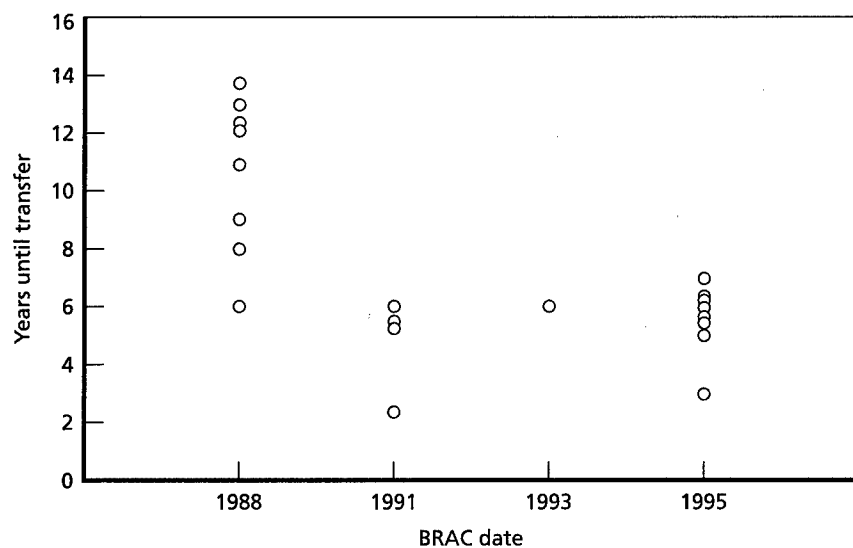


UXO land at the Presidio and Fort Meade has successfully transferred due to congressional intervention. At Forts Ord, Ritchie, and McClellan, less than 1 percent of the UXO land has transferred. Forts Devens and Sheridan have successfully transferred UXO land using available conveyance mechanisms.

Efficiency of Non-UXO Transfers

We analyzed the data to determine whether there were differences in the time required to transfer land without UXO among bases closed under the different BRAC rounds. (So few UXO parcels have been transferred that making a similar comparison for parcels with UXO is not meaningful.) Figure 2.2 shows our analysis of the time taken to transfer land not containing UXO. The four prior BRAC rounds are represented on the horizontal axis. The number of years between BRAC listing of the installation and deed transfer is represented on the vertical axis. For each installation, we determined the average

Figure 2.2
Time for Transfer of Land Not Containing UXO at Army BRAC Installations



NOTE: Transfer times are weighted average values for all transfers at each installation to date.

time required for non-UXO transfers to date, weighted according to the amount of acreage conveyed with each transfer. It is important to note that Figure 2.2 cannot be used to compare mean transfer times among BRAC rounds because of the differences in the proportion of total non-UXO lands transferred in each round (for this particular set of 26 installations): nearly all of the non-UXO acreage from the 1988 BRAC round has transferred, but only 79 percent from the 1991 BRAC round, 88 percent from the 1993 BRAC round, and 58 percent from the 1995 BRAC round has been transferred. The figure does, however, appear to indicate that more transfers are occurring in a shorter time at bases closed in the later BRAC rounds than in the 1988 BRAC round.

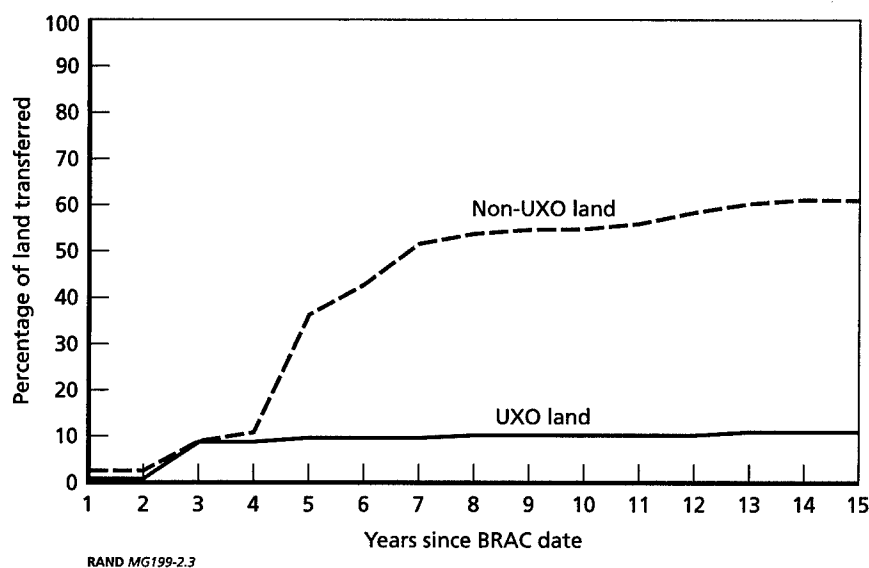
Decreases in mean transfer time for non-UXO lands would be expected in successive BRAC rounds, given the growing experience of

transferring land and the expansion of conveyance options legislated by Congress. In 1993, Congress amended the BRAC legislation to allow DoD to transfer property to local land-reuse authorities at prices below fair-market value or at no cost to promote economic development of communities. The legislation required such transfers in rural areas to be at no cost. Congress further broadened the provisions for economic development conveyances in the National Defense Authorization Act of 2000, allowing new economic development conveyances to be at zero cost and allowing revision of previous agreements to eliminate charges to the local reuse authority under certain conditions. Before this legislation, deed transfers had been delayed by negotiations over what constituted a fair price for the land (U.S. GAO, 2002). Interestingly, recent legislation authorizing an additional BRAC round in 2005 suggests that DoD “shall seek to obtain” fair-market value for the BRAC land, but does not actually require it (National Defense Authorization Act of 2003). Based on the data from the previous BRAC rounds, seeking fair-market value may delay the transfer process.

Stalled UXO Transfers

We also wanted to determine the cumulative difference between the amount of land not containing UXO that has been transferred and the amount of land containing UXO that has been transferred. Figure 2.3 shows the results of this analysis. The figure shows the amount of land transferred as a function of the number of years since the BRAC listing. As shown, 10 percent of the BRAC acreage containing UXO at the 26 sites in our sample has been transferred. By comparison, 61 percent of the acreage not containing UXO has been transferred. Of the 9,042 acres with UXO that have been transferred, 8,100 (90 percent) were at Fort Meade and were conveyed in 1991 and 1993 by congressional act. Fewer than 1,400 acres, or less than 2 percent of the total, have been transferred via the normal disposal process.

Figure 2.3
Cumulative BRAC Land Transfers at the 26 Installations



Case Studies: UXO Transfers Have Occurred in Special Circumstances

Although only about 10 percent of the UXO acreage, in total, has been transferred, initial information that we obtained indicated that UXO land transfers had occurred at eight of the installations in our sample. Table 2.2 lists the locations. (We subsequently learned that UXO land was leased—prior to discovering UXO—but has not as yet transferred at Fort Ritchie.)

We conducted case studies using structured interviews at each of these installations to identify the factors affecting the UXO land transfer process. The purpose of this analysis was to determine whether commonalities among these transfers might provide a model for UXO land transfer in BRAC 2005. We spoke to installation personnel, EPA representatives, state regulators, and local citizens to gain understanding of the processes involved in the transfers. Table 2.3

Table 2.2
Case Study Installations

| Installation | Location |
|---------------------------|---------------|
| Fort Devens | Massachusetts |
| Fort Ritchie | Maryland |
| Fort Meade | Maryland |
| Jefferson Proving Ground | Indiana |
| Fort Sheridan | Illinois |
| Fort McClellan | Alabama |
| Presidio of San Francisco | California |
| Fort Ord | California |

summarizes the results of these case studies. The appendixes contain detailed descriptions of the closure and land transfer process at each installation. Although no UXO lands have been transferred at the Savanna Army Depot, a case study was nonetheless conducted to add to our understanding of barriers to transfer.

As shown in Table 2.3, the cases of UXO land transfer can be grouped into two categories: those where less than 1 percent of the UXO land has transferred and those where more than 90 percent has transferred. The former category includes Fort Ord, Fort McClellan, Jefferson Proving Ground, and Fort Ritchie. The latter category includes the Presidio of San Francisco, Fort Meade, Fort Sheridan, and Fort Devens.

The land transfers at the Presidio and Fort Meade occurred under exceptional circumstances. Sixteen years before DoD designated the Presidio as a BRAC site, Congress stipulated that the Presidio would become part of the Golden Gate National Recreational Area if DoD ever determined the base to be in excess of its needs. In addition, the Army was unaware that any ordnance other than that from small arms was present before the documents were signed that trans-

Table 2.3
Reasons Cited by Interviewees for Successful Land Transfer

| Installation | UXO Acres Transferred (% of Total) | Recipient(s) | Primary Reasons for Successful Transfer |
|---|---------------------------------------|---|--|
| Installations with less than 1 percent of UXO land transferred | | | |
| Fort Ord | 72 (0.6%) | Marina Municipal Airport | Practice (inert) ordnance only |
| Fort McClellan | 20 (0.37%) | Joint Powers Authority (local reuse authority) | No UXO found when land was scanned with metal detectors |
| Jefferson Proving Ground | 100 (0.19%) | Private developer | Transfer occurred in cantonment area, with much lower UXO density than in range area; single land receiver; minimal regulatory oversight |
| Fort Ritchie | 0 (0%) | PenMar Development Corp. | Range inventory report indicated some UXO land was transferred; in fact, land is under lease (and had been assumed clear of UXO before the lease was signed) |
| Installations with greater than 90 percent of UXO land transferred | | | |
| Presidio of San Francisco | 17 (100%) | National Park Service | Only small-arms ammunition thought to be present before transfer; transferred by act of Congress |
| Fort Meade | 8,470 (100%) | Patuxent National Wildlife Refuge | Transferred by act of Congress |
| Fort Sheridan | 86 (100%) | Lake County Forest Preservation District | Low UXO density on shore; strong financial incentives for transfer; small number of land recipients; minimal regulatory oversight of UXO removal process |
| Fort Devens | 573 (92%) | Bureau of Prisons, U.S. Fish and Wildlife Service | Low UXO density; strong financial incentives offered by state; small number of land recipients; minimal regulatory oversight of UXO removal process |

ferred both the deed and cleanup responsibility.¹ At Fort Meade, the largest UXO land transfer to date, the transfer occurred by an act of Congress, short-cutting local debate over what amount of UXO clearance was necessary before transfer.

Fort Devens and Fort Sheridan are the only cases among the 26 installations we reviewed where a significant amount of the total land with UXO was transferred when the presence of UXO was known at the outset and when Congress did not intervene. Both installations shared common characteristics that facilitated the transfer and avoided the kinds of delays that have occurred elsewhere:

- **Low UXO density.** In both cases, the number of UXO items found per acre was very small. At Fort Devens, the average UXO density in areas surveyed was 0.16 items per acre (105 items found on a total of 633 acres designated for UXO clearance). At Fort Sheridan, the density on shore was about 0.14 items per UXO-affected acre (about 12 UXO items found on a total of 86 acres).
- **Small number of property recipients.** Another factor expediting transfer at both installations was the very small number of property recipients involved, which simplified the negotiating process. At Fort Devens, three-quarters of the total acreage went to a development authority empowered by the state government to oversee and implement all redevelopment, issue bonds, and borrow up to \$200 million to finance the reuse. Three federal agencies—the Bureau of Prisons, the Fish and Wildlife Service, and the Department of Labor—divided up the rest of the land. At Fort Sheridan, two entities received all the land: the Lake County Forest Preservation District and the local reuse authority, which then sold the property to four private developers.

¹ When the Presidio transferred from the Army to The Presidio Trust, the Army agreed to transfer \$100 million to the Trust over four years to cover the cost of cleanup. Additionally, the Trust purchased \$100 million worth of environmental insurance to protect against any unforeseen events or overruns.

- **Strong financial incentives.** Financial incentives also helped to speed the transfer process. Massachusetts enacted legislation exempting Fort Devens from personal property taxes and providing utility service at wholesale rates. At Fort Sheridan, the value of the land created a similar demand for redevelopment: Fort Sheridan contains the only lakefront property to become available in the greater Chicago area for more than a century. The starting price for a single-family home on the redeveloped base is nearly \$650,000.
- **Minimal regulatory oversight of UXO removal process.** In both cases, the Army conducted UXO clearance with minimal regulatory oversight, using the “time-critical removal action” process (CERCLA, section 106). This process allows the federal resource manager to proceed with environmental cleanup without EPA review in situations where the danger to the public is imminent. The landowner thus avoids the paperwork and regulatory oversight required for what are known as “remedial actions,” which address long-term, complex environmental threats (U.S. EPA, 2002).

Although less than 1 percent of the total UXO acreage has transferred at the other installations listed in Table 2.2, we also studied these installations to identify factors leading to the transfers that have occurred. Some of the factors leading to these successes were similar to those identified for Fort Devens and Fort Sheridan. For example, UXO land transfers have occurred where UXO densities were relatively low. At Fort Ord and Fort McClellan, no live UXO (other than inert, practice ordnance at Fort Ord) was found on acreage that has been transferred and was initially suspected to contain UXO. At the Jefferson Proving Ground, UXO land transfers have been limited to the former cantonment area and have not occurred in the heavily contaminated northern firing range. In addition, the number of parties involved in the property transfer at Jefferson was small: all 100 UXO acres were conveyed to a single private developer, which minimized negotiations. Also, at Jefferson the Army used the

time-critical removal action process, with minimal regulatory oversight.

Although we listed Fort Ritchie on Table 2.2, no UXO-containing land has been transferred there. We included Fort Ritchie as a case study because a draft document prepared for DoD's new inventory of all current and former ranges indicated that 69 UXO acres had been transferred (URS Group, 2002). However, we later learned from the installation's BRAC environmental coordinator that the Army still owns this land and is leasing it to a private developer. This acreage was thought to be clear of UXO, but crews surveying the installation to delineate the boundaries of the range areas found significant quantities of ordnance on the property, after a lease allowing residential use already had been signed. The problems with identifying areas containing UXO and the transfer status of these areas at Fort Ritchie are typical and result from historically poor record-keeping rather than negligence or error on the part of those compiling the UXO site inventory.

At future BRAC installations (and at the earlier BRAC installations where about 90 percent of the UXO land has not been transferred), use of the time-critical removal action process on a routine basis may become difficult if the EPA and others challenge this approach. One memo written by the EPA Federal Facilities Compliance Office stated, "Using time-critical/emergency responses as the sole response paradigm should not be a default approach for the Services/USACE, especially for range problems that are well beyond the scope of such actions" (Fields, 1999). A recent court decision responding to a lawsuit at Fort Ord lends legal support to EPA's position (U.S. EPA, 2001). The court, reviewing a challenge to the Army's use of time-critical removal actions at Fort Ord, stated that

[T]he government's effort has been proceeding for six years and is part of a broader plan to effect a permanent solution. Both these factors weigh strongly in favor of finding that the OE [ordnance and explosives] clearance is a remedial response. . . . [I]t cannot fairly be said that this is a situation in which "there is no time to safely conduct review due to the exigencies of the situation" (cited in U.S. EPA, 2001, p. 2-18).

The draft EPA policy on UXO states that time-critical removal actions are appropriate for “situations in which the military will have difficulty controlling potential exposures to OE and there are imminent threats to human health and the environment,” but that “non-time-critical removals are adequate at many sites where access restrictions are in place” (U.S. EPA, June 2001).

Conclusions

The Army has made continuous progress in transferring BRAC land not affected by UXO. At the 26 installations we surveyed, which account for 82 percent of all Army BRAC property, 61 percent of land not containing UXO has been transferred. In contrast, the transfer of land containing UXO has all but stalled at the installations we examined. The Army has been able to release only 10 percent of UXO-containing property. Most of this property (90 percent) was on one installation and was transferred only with intervention from Congress. The few additional cases in which parcels containing UXO have been transferred have had very low UXO densities, a small number of parties involved in the negotiations, and strong financial incentives to convey the land. In addition, in these latter cases, UXO clearance has proceeded with little or no regulatory oversight, which may not always be possible in the future due to challenges from the EPA and others.

As is clear from the analysis in this chapter, the BRAC process has not been successful in returning land to productive uses for the affected community in most cases where significant UXO is present.

Factors Affecting UXO Land Transfer in Previous BRAC Rounds

Planning an effective strategy for managing UXO sites encountered in the 2005 round of Army base closures requires an understanding of factors that have affected the transfer of UXO-containing land from previous BRAC rounds. As described in Chapter Two, UXO land transfers under BRAC have been rare. Our interviews during the case studies and with others involved at UXO sites suggested that common obstacles block UXO land transfers. Routinely mentioned causes of delays include lack of data on UXO amounts and locations, regulators' views that all UXO should be removed, lack of agreement on standards for UXO cleanup, land receivers' concerns about liability for any UXO remaining after the clearance, the public's concern about UXO risks, funding limitations, and the performance of detection technologies.

To determine which factors contribute most frequently to delays in UXO cleanup and land transfer, we surveyed individuals who have been involved at Army BRAC installations containing UXO.¹ This chapter presents the results of the survey. These results suggest which causes of delay might be solved with technological fixes and which are likely to require systemic changes in how the government manages and regulates UXO-containing land.

It is important to note that the survey centered on factors specifically affecting transfer of land with UXO. We did not pursue

¹ A copy of the interview protocol appears in Appendix C.

questions related to the effects of munitions constituents, other environmental contaminants, or other nonenvironmental issues, although these factors were raised by a few respondents when we asked them to identify other factors affecting the transfer process at their installation.

Installations Included in Analysis

Table 3.1 shows the installations included in the survey, the total amount of UXO acreage at each, and the amount of this acreage that has been transferred. These 10 installations were drawn from the list of 26 major Army BRAC installations shown in Table 2.1. They include all the installations from Table 2.1 containing UXO except the Presidio of San Francisco. We did not include the Presidio in our survey because all the land there was transferred before any ordnance items other than small arms were discovered. Thus, the presence of UXO—because it was unknown—did not affect the decisionmaking process there.

Table 3.1
Installations Included in Survey

| Installation | Total BRAC UXO Acres | BRAC UXO Acres Transferred | Percentage Transferred |
|--------------------------|----------------------|----------------------------|------------------------|
| Fort Devens | 623 | 578 | 93.00 |
| Fort Dix | 12 | 0 | 0 |
| Fort Meade | 8,470 | 8,470 | 100.00 |
| Fort McClellan | 5,818 | 20 | 0.34 |
| Fort Ord | 12,000 | 72 | 0.60 |
| Fort Ritchie | 365 | 0 | 0 |
| Fort Sheridan | 86 | 86 | 100.00 |
| Jefferson Proving Ground | 53,494 | 100 | 0.19 |
| Savanna Army Depot | 5,590 | 0 | 0 |
| Seneca Army Depot | 3,255 | 0 | 0 |
| TOTAL | 89,713 | 9,326 | 10 |

At each installation, we surveyed three individuals: the Army's BRAC environmental coordinator, the EPA remedial project manager, and the chair of the citizen Restoration Advisory Board appointed to represent community interests in decisions about cleanup. We contacted each of these individuals in advance with a letter explaining the nature of our study and requesting their participation. Then, we followed up with a formal telephone survey. Of the 30 individuals we contacted, 26 agreed to participate.

As with any survey, the interpretation of findings is limited by the sample of individuals. In this case, our sample did not include private developers, who might be expected to have a somewhat different perspective than the other types of individuals we surveyed.

Possible Contributing Factors in UXO Land Transfer Delays

The survey consisted of a structured set of questions designed to elicit the respondent's opinion about which factors were important in either facilitating or delaying UXO land transfer at his or her installation. We described each of the possible factors that we thought might be important. Then, we asked the respondent whether each factor had (1) facilitated, (2) had no effect, (3) slowed, or (4) prevented UXO land transfer at the installation. Finally, we asked whether other issues, not identified on the survey, have affected land transfer at the respondent's installation.

The survey considered eight factors that might contribute to the delays at UXO sites, as described below. We generated this list based on informal discussions, which we conducted before the survey, with a number of individuals involved in UXO land transfer.

Funding

At some installations, we had heard reports that UXO cleanup had been slowed by lack of funding. For example, at the Savanna Army Depot, a citizen member of the Restoration Advisory Board told us that funds to proceed with cleanup plans were insufficient until the

local member of Congress intervened. We asked the survey participants whether funding availability had affected UXO land transfer at their installation. Specifically, we asked, "Would you say that the availability of funding for UXO clearance has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

UXO Information

We heard from several installation representatives that information about the locations, amounts, and types of UXO present only became available after land-reuse decisions had been finalized. For example, at Fort Ord, portions of a heavily contaminated range area were slated for residential reuse. Much later and after extended negotiations, the local reuse authority agreed to swap this area for a parcel with much less contamination. A number of those involved at UXO sites suggested that having full historical documentation of potential UXO areas should be a requirement before base closure and land-reuse decisions are settled. We asked the survey respondents, "Would you say that the existence or lack of clear and concise information concerning the amount, locations, and types of UXO present has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Remediation Standards

At a number of installations, we heard that progress has been stalled by lack of agreement on "how clean is clean." That is, the Army, state and EPA regulators, and local reuse authorities have been unable to reach consensus on what depth of UXO clearance should be required for different land uses. Further, they have been unable to agree on what process should be used to achieve that depth. For example, at Fort Ord, the California Department of Toxic Substances Control proposed excavating entire sectors of the former range area to depths of as much as ten feet to guarantee that the land would be safe for residential reuse. The Army, on the other hand, proposed digging only in locations where a metal detector signaled the presence of a metal anomaly, and then only to four feet. Even when all those involved can agree on a basic cleanup process—such as scanning the site

with a metal detector and digging up all metal objects found—they have often been unable to agree on what steps should be taken to verify the quality of the clearance. For example, some have proposed resurveying randomly selected square grids on the site, while others have suggested conducting a meandering walk across the site and resurveying with a metal detector in the process.

The DoD and EPA attempted to resolve the issue of UXO clearance standards at the national level in the late 1990s. At EPA's request, DoD attempted to draft the so-called Range Rule, which would have specified clearance depth requirements, quality-control procedures, and oversight responsibilities for UXO sites. However, DoD and EPA were unable to agree on key provisions of the rule, and negotiations foundered in late 2000. No national effort to create a new rule has occurred since then.

To assess the importance of remediation standards, we asked the survey participants, "Would you say that the existence or lack of clear standards for UXO response has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

DoD Procedures

Some of those involved in UXO remediation told us that the DoD lacks standard procedures for managing and conducting remediation at UXO sites. For example, the Army's regulations for UXO response expired in June 2002, and new regulations have not been written to take their place. The expired regulation is entitled "Explosives Safety Policy for Real Property Containing Ordnance and Explosives" (Department of the Army, 2000). The lack of an updated version not only can lead to inconsistencies in the handling of UXO from one installation to the next, but also may leave the Army vulnerable to lawsuits challenging the cleanup process, further delaying transfer. We obtained documentation verifying that this is the case. We asked the survey participants, "Would you say that the existence or lack of standard DoD operating procedures for UXO response has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Liability Concerns

A frequently cited cause of delays in land transfer is the intended land recipient's concern about being held liable for UXO found after the Army leaves. For example, at Jefferson Proving Ground, the Fish and Wildlife Service was slated to take possession of the entire north firing range area but withdrew its offer because of liability issues. Federal agencies are reluctant to assume ownership of UXO-containing land because of the potential for EPA to hold the agency liable for cleanup costs, according to Rebecca Rubin, former head of the Army Environmental Policy Institute. Private entities have similar fears of liability. In addition, private landholders could be legally liable, either on a negligence theory or based on strict liability, if they take title to UXO-contaminated property and someone gets injured, according to Barry Steinberg, former head of the Army Environmental Law Division. To assess the extent to which liability concerns have slowed UXO land transfer, we asked survey respondents, "Would you say that the land receiver's perceptions of liability that may occur have facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Risk Concerns

Another commonly cited barrier to UXO land transfer is the public's concern about the risk from UXO and whether the Army's procedures for removing it will render the land sufficiently safe. In some cases, this concern stems from a lack of trust in the Army to carry out its environmental remediation responsibilities. For example, a citizen neighbor of the Savanna Army Depot told us, "I've gotten so I don't trust the Army in its statements" (see Appendix L). This mistrust, he indicated, is the result of a long history of the Army's denying that certain contaminants (including radionuclides and a sizable pesticide dump) were present, only to be proved wrong after local officials insisted on an investigation. We asked the survey participants, "Would you say that the public perception of risk from UXO has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Regulators' Opinions About Risk

A concern often cited by Army officials involved at UXO sites is that environmental regulators will not accept any risk from UXO above zero, leaving the Army in an impossible situation because zero risk cannot be achieved with current technology. For example, EPA's draft *Handbook on the Management of Ordnance and Explosives at Closed, Transferring, and Transferred Ranges and Other Sites* states, "There is no quantifiable risk level for OE exposure below which you can definitively state that such potential exposure is acceptable" (U.S. EPA, 2002, p. 7-44). The same EPA manual also indicates that although there is no acceptable risk level for UXO, 100 percent UXO removal will not be required at all sites. Nonetheless, the difference between EPA's and the Army's perspectives on risk has delayed agreements on UXO cleanup processes, which in turn has delayed land transfer. We asked survey participants, "Would you say that environmental regulators' positions about risk from UXO have facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Performance of UXO Detection Technology

No existing technology can guarantee that all buried UXO has been found and removed. The state of the art in UXO clearance involves surveying the affected area with a metal detector, recording the locations of anomalies (i.e., metal-containing objects) in a database, and then returning to the anomaly locations and carefully excavating to determine whether the anomaly is UXO. Unfortunately, as has been well documented, metal detectors are far from perfect in their ability to detect UXO (Das, Dean, et al., 2001; U.S. Army Corps of Engineers, 2002; MacDonald and Lockwood, 2003). For example, the Army Corps of Engineers conducted extensive field tests of metal detectors at Fort Ord to identify the most effective equipment for use in UXO surveys (U.S. Army Corps of Engineers, 2002). The Corps found that none of the instruments located 100 percent of the ordnance. The top-performing equipment could find up to 98 percent of UXO, but only when the search crews dug 6.6-foot-wide holes at every location where the instrument signaled an anomaly. When the

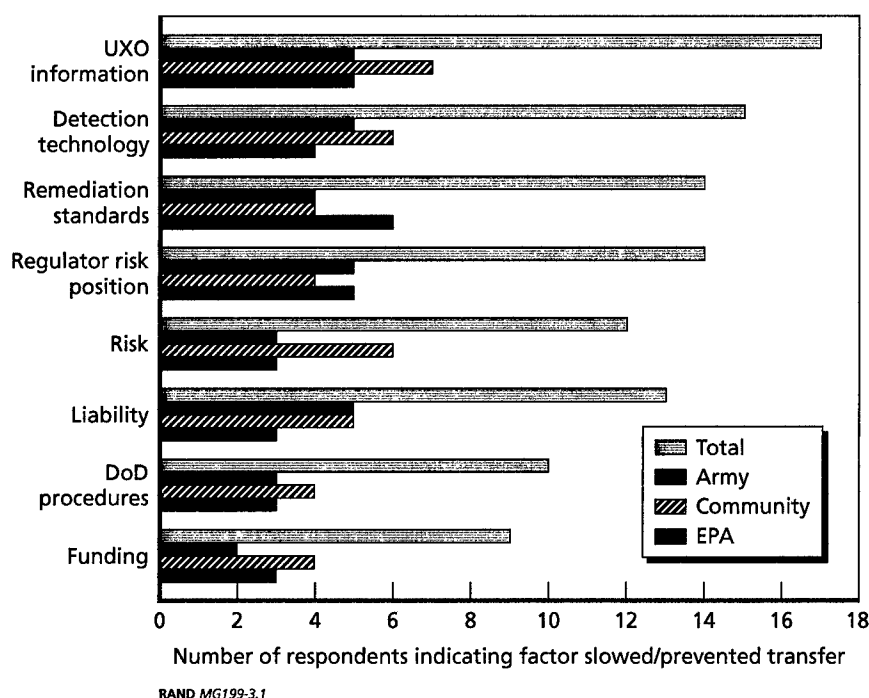
size of the holes excavated was reduced to 3.2 feet in diameter, the best instruments found 83 percent of the UXO. When the search diameter was further reduced to 1.6 feet, the best detector found a maximum of 43 percent of UXO. Thus, even when a site is carefully surveyed with a metal detector, and even when very large holes are dug to investigate every suspicious object, some UXO will inevitably remain behind. To gauge the importance of this technological limitation on UXO land transfer, we asked survey respondents, "Would you say that the state of knowledge of the effectiveness of UXO detection instruments has facilitated, had no effect, slowed, or prevented the transfer of land at your installation?"

Multiple but Common Causes of Delays

Figure 3.1 summarizes the results of the survey. As shown, most survey respondents indicated that each of the factors we described above had contributed to delays in land transfer at their installations. However, the frequency at which the factors were cited varied. It is important to keep in mind that circumstances at each installation are unique because of differences in Army personnel, regulators, communities, and environmental conditions. Furthermore, the number of Army BRAC installations with UXO is too small to draw conclusions based on statistical significance. In addition, factors unrelated to UXO, such as the presence of other kinds of environmental contaminants (solvents in groundwater, for example), can contribute to delays. Nonetheless, the survey results provide insights about what might be the most common causes of delays in UXO land transfers.

The factor most often cited as contributing to delays is lack of information about UXO location, quantities, and types. Among all the survey respondents, 17 (65 percent) said that lack of information had either slowed or prevented the transfer of UXO-containing land at their installation. The Army and community respondents cited lack of information most frequently as a cause of delays, with 63 percent and 78 percent of respondents, respectively, associating this fac-

Figure 3.1
Survey Results



tor with delays. Among the EPA group members, 56 percent associated lack of information with delays.

The second most commonly cited contributor to land transfer delays was the inability of current detection technologies to guarantee that all UXO has been found. Of the total group of respondents, 15 (58 percent) said that the limitations of detection technologies had either slowed or prevented UXO land transfer at their installation. Among Army respondents, 63 percent linked delays to detection technology limitations. Among community respondents, 67 percent associated detection technology limitations with delays. As a whole, the regulator group was less concerned about detection technology limitations than the other two groups: 44 percent of the EPA respondents associated detection technology limitations with delays.

Cited third most frequently were the related factors of the lack of standards for UXO response and regulators' positions about risks from UXO; for each of these two factors, 14 (54 percent) of the survey respondents indicated that the factors had slowed or prevented land transfer. The EPA respondents appeared more concerned about these issues than other respondents: 67 percent of EPA respondents said lack of standards had slowed or prevented land transfers, while 50 percent of Army respondents and 44 percent of community respondents associated lack of standards with delays.

The next most frequently cited cause of delay, identified by 13 (50 percent) of the respondents, was liability concerns. The Army group associated liability issues with delays more than the other two groups: 63 percent of Army respondents, 33 percent of EPA respondents, and 56 percent of community respondents associated liability with transfer delays.

Twelve respondents (46 percent of the total) said that public concerns about risk had delayed land transfer. For the community group, public concerns about risks were more important than for the other two groups: 67 percent of the community respondents associated their risk concerns with transfer delays, while 33 percent of EPA respondents and 38 percent of Army respondents linked public risk perception to delays.

Finally, 10 (38 percent) and 9 (35 percent) of the respondents, respectively, indicated that the lack of standard DoD operating procedures and funding issues have slowed or prevented land transfer at their installation. About an equal number of respondents in each group indicated that lack of standard DoD procedures had contributed to the delays. The community group expressed more concern about funding than the other two groups, with 44 percent of the community members associating funding limitations with delays, as compared to 25 percent of the Army group and 33 percent of the EPA group.

Survey respondents also indicated additional causes of delays not included in our original list of questions. Six respondents said that contamination of soil and groundwater with chemicals from the UXO or other sources had led to delays at their installations. Three

said that the presence of chemical weapons had slowed land transfer. Another three said that pending lawsuits had blocked the transfer process.

Conclusions

In summary, based on the survey results, the leading causes of delay in UXO land transfer, in order, appear to be the following:

- lack of information about UXO locations, quantities, and types before land-reuse decisions are made;
- inability of detection technologies to ensure that all UXO items have been located and removed;
- lack of accepted standards for UXO cleanup; and
- regulators' positions about risks of UXO.

At least half the respondents in our survey told us that each of these factors had slowed or entirely prevented UXO land transfer. Other contributing factors were public concerns about UXO risk, lack of standard DoD operating procedures, insufficient funding, groundwater and soil contamination, chemical weapons presence, and litigation. It is important to keep in mind when evaluating these results that the small size of our survey group did not allow for evaluation of the statistical significance of the results. Furthermore, each installation is unique, and the forces either encouraging or impeding the transfer of UXO-containing land vary from one locale to the next. Nonetheless, the survey results illustrate that those involved at different installations have experienced common factors that affected the transfer of UXO-containing land.

The Army is already making progress in addressing the leading cause of delay: the lack of information about UXO locations, types, and quantities. As required by Congress in the National Defense Authorization Act of 2002, the Army is developing an inventory of all closed, transferring, and transferred training ranges where ordnance may have been used. The inventory will eventually include closed

ranges (i.e., those no longer in use for munitions training or testing) at active Army bases as well as at closed bases. For each former range area, the inventory will contain geographic data (location and boundaries) and information about the types of munitions used. The Army is maintaining the inventory in a new repository called the Army Range Inventory Database (ARID).² Once it is completed, ARID can be consulted to identify potential UXO areas at installations being considered for closure in 2005. This capability was not available for the four previous BRAC programs, and it should prove to be an important planning aid for the future, assuming that it can be completed soon.

Despite the progress on developing a database of UXO sites, problems remain in keeping track of the kinds of UXO information needed when a base closes. Army regulations on retention of records call for periodic destruction of information relevant to UXO. For example, Army regulation N1-Au-98-11, entitled "Ordnance Incident Reports," requires the destruction of records concerning UXO incidents at active installations after three years. Similarly, regulation 11-NN-3358, titled "Range Clearances," specifies that documentation on the clearance of UXO should be destroyed after 10 years. The destruction of important documents concerning UXO incidents, clearance efforts, and related matters has increased the difficulty of gathering data on UXO locations, types, and quantities. Revising these regulations to require retention of all records pertinent to UXO, perhaps as part of ARID, would facilitate future efforts to delineate UXO areas.

Research is under way to address the issue of UXO detection technologies. According to the Defense Environmental Restoration Program Annual Report to Congress, the DoD invested \$25 million in 2003 in research related to UXO detection (DoD, 2003, p. 84). About half of this funding goes to research on improving sensors for

² The current (incomplete) version is available at http://63.88.245.60/derparc_fy02/derp/MMRP.htm.

close-in detection, with the rest spent on related research, such as UXO removal and disposal methods (DoD, p. 84).

The remaining factors delaying UXO land transfer are not amenable to technological fixes, such as a database or a better metal detector. Rather, addressing these other obstacles—including lack of standards, environmental regulators' positions about risks from UXO, and liability concerns—will require policy changes, organizational changes, or new financial mechanisms. Creating a magic detector that could correctly locate every UXO item might address these problems, if its technology could guarantee zero risk and therefore zero liability and if it could be implemented at a feasible cost. However, no such technological solution is on the horizon (MacDonald and Lockwood, 2003). Thus, short of a technological miracle, policy and organizational changes are going to be needed to avoid creating another UXO quagmire in BRAC 2005. The next chapter assesses three approaches and discusses the extent to which each would mitigate the most important impediments to land transfer, other than data and technological limitations.

Options for Improving Efficiency of Future UXO Land Transfers

As described in the preceding chapters, the process of transferring closed Army installations to public and private interests is often complicated and slow. The actual or potential presence of UXO on these lands makes the environmental response process more difficult, introducing additional safety concerns, constraints on future use, and consequent liability and risk management problems. Nonetheless, the Army still faces the challenge of expeditiously moving BRAC acreage off its books.

In the previous two chapters we outlined the results of our data-gathering efforts, interviews, case studies, and formal survey and identified core barriers to transferring BRAC land containing UXO. Before we discuss new options for expediting UXO land transfers, we examine some changes to the BRAC process that were made since the last round of base closures in 1995 in an effort to improve and expedite transfers. We discuss how effective these mechanisms have been, or have the potential of being, for transferring UXO land. We conclude the chapter by presenting three options for addressing the barriers to transferring UXO land as the Army moves into BRAC 2005.

Previous Actions Taken to Expedite Transfers

Congress is aware of the difficulties involved in transferring former military land. There is always a balance between the economic possibilities of that land for the surrounding community and the inherent

risks of land previously used for military training. CERCLA requires all necessary remedial action to occur before the transfer of any federal property to nonfederal entities.¹ Because of this CERCLA provision, in the first BRAC rounds DoD had to clean up the land before it could transfer ownership. Later, Congress and DoD recognized that land transfers might be more expeditious if the cleanup matched the intended use (not all uses will require full remedial action) and that DoD might not always be the most efficient at performing the remediation. As a result, Congress changed the CERCLA requirement as it relates to land transfers under BRAC.

Congress made two key changes to CERCLA: authorization of “early transfer authority” (ETA) in 1996 and introduction of the “conservation conveyance mechanism” in 2003. Through the use of ETA, land can be conveyed to federal and nonfederal entities before environmental response and UXO clearance actions have occurred, allowing cleanup and reuse to be more complementary. Conservation conveyance legislation allows the Army and other services to transfer BRAC land to private, nonprofit land-conservation groups without first clearing the UXO and remediating other environmental contamination. Congress authorized this mechanism to enable ecologically valuable lands to be conserved more expeditiously, recognizing that full-site clearance and remediation might not be necessary on lands where human access and activities would be restricted and might, in fact, damage the ecosystem.

Privatization of Cleanup Using Early Transfer

Local reuse authorities are generally anxious to expedite redevelopment of former installation property, restore jobs lost from the base closing, and stimulate local economic development. They also want to be involved with decisions about environmental response actions to ensure their consistency with reuse plans. In the past, the LRAs’

¹ As a matter of policy, other federal agencies receiving land from DoD (e.g., the Department of the Interior) may require that remedial actions be completed prior to transfer or that DoD commit funds for such actions prior to transfer.

dependence on the military's cleanup schedule made it difficult for them to launch their own plans for reuse of the property. Lacking title before completion of response actions, LRAs were hence unable to enter into agreements with developers and other reuse partners. The LRAs often added to the confounding factors by frequently altering reuse plans, thereby making it difficult to reach agreements with the Army on clearance standards based on intended reuse.

In 1996, Congress authorized a waiver of CERCLA requirements for federal facilities, providing the DoD with ETA. ETA authorizes that all the remedial actions required prior to transfer of federal property can be deferred [CERCLA section 120(h)(3)] as long as certain conditions are met: the property must be suitable for transfer for the intended use; terms of the transfer are submitted for a 30-day public comment period; the transfer must not substantially delay any cleanup actions; the deed must contain any necessary land-use restrictions to protect human health and the environment; and the agreements must have the concurrence of the state's governor. DoD also retains the financial responsibility for the environmental cleanup regardless of whether it is performed by DoD or the transferee (U.S. GAO, 2002).

ETA is not a conveyance mechanism and must be used in conjunction with an existing transfer mechanism, such as an economic development conveyance. Using ETA, the LRA may opt to assume responsibility for the cleanup to integrate the cleanup actions more fully with redevelopment priorities. It is also possible to have early transfers, with the government retaining the cleanup responsibility. In those cases, the recipient does not play as significant a role in cleanup decisions, but does benefit from being able to make use of the property sooner and taking ownership before cleanup is complete. However, the greater advantage of early transfer occurs when the new owner assumes cleanup responsibility along with the land transfer.

ETA and conservation conveyance shift the focus from installation-wide cleanups and the debate about "how clean is clean enough" to managing risks under specified reuse scenarios. Instead of pursuing a pre-established cleanup standard before entering into transfer negotiations, the military department and the transferees agree to match

the response action to the reuse function. With this method of transfer, the regulators work primarily with the new owners—the LRA or developer—and consult with the Army or other department.

Uses of Early Transfer Authority for Conveying UXO-Contaminated Property

Although ETA in theory should speed up UXO land transfers and although it has been available for seven years, we are aware of only a few examples of transferring UXO land via ETA. Within the Army, there are two successful UXO land transfers using ETA: one at Fort Devens and one at Fort Sheridan. At both of these installations, the land was valuable, the UXO risk was considered low, and the redevelopment authorities were actively involved in the transfer process.

Other services have used ETA to transfer UXO land but also in only a few cases. In 2002, the Navy transferred Mare Island to the city of Vallejo, California. UXO in one parcel was buried under thousands of tons of dredged material and therefore unlikely to surface. The city contracted with a private company to clean and redevelop that parcel. In a second parcel, the UXO was offshore and was thought to be a potential risk in the future. The Navy retained responsibility for cleanup of the second parcel even though the deed to the land transferred to the city of Vallejo.

In another example, although not yet finalized, the Navy is negotiating an early transfer of portions of Adak Naval Air Station in Alaska, including land containing UXO, to the Aleut Corporation. The UXO that remains is buried deep in a remote tundra region, and fencing restricts access to the land.

In each of these cases, the parties were able to reach early agreement about risk assessment, sampling protocols, level of cleanup, and land use. Parties also accepted the fact that UXO would remain even after the planned cleanup was completed. At each installation, potential human contact with the UXO was considered unlikely. At Mare Island, UXO was known to be present, but the developer was still able to purchase environmental insurance to cover those risks.

In legal terms, the presence of UXO does not affect the conveyance of land using ETA. However, it is often a stumbling block for

the LRA or developer because they must accept the deed to the land (and thus the risks associated with UXO) at the time of the early transfer. Early transfers depend heavily on good communication and interaction of all parties (federal and state regulators, LRA or developer, and the military service). The parties involved in the transfer must be educated about and agree on the steps in the process, including the regulatory requirements. The parties must also be aware of the availability of complementary tools, such as environmental insurance, that will assist the transferees in managing the risks. Ultimately, the financial incentives to develop the land must be valuable enough to attract the interest of the community, leading it to assume the accompanying risks.

Although it has not used ETA much in the past to transfer UXO land, the Army has plans to increase its use. Our data-gathering efforts for this report concluded in May 2003. We are aware that in the summer and fall of 2003, the Army succeeded in transferring UXO land using ETA at Fort McClellan.² The Army BRAC Office has gained experience in using the mechanism and envisions using it more frequently in the future.

Privatization of Cleanup Using Conservation Conveyance

BRAC properties often contain large tracts of undeveloped land, which make them desirable for wildlife and ecological conservation and public open space purposes. A large portion of the acreage in both the Army and Navy BRAC inventories still awaiting transfer is considered suitable for conservation or recreational functions (Rubin, 2001). However, conveying land for conservation purposes lacks the traditional economic incentives of redevelopment, which leaves open the question of how the land receiver will pay for operation and maintenance costs.

² The Army also used ETA at the Alabama Army Ammunition Plant and the Volunteer Army Ammunition Plant. These facilities contain wastes from the manufacturing of explosives, but not UXO.

The legal conveyance mechanisms that allow BRAC property to be transferred for public benefit previously restricted such transfers to federal and state land management entities. There was no allowance for the land to be transferred to a nonprofit conservation organization that could both clean up and manage the land in the public interest. However, federal and state land management authorities often were not in a position to accept the additional financial and management responsibilities and the perceived liability issues associated with these lands.

In an effort to facilitate transfers of land for conservation purposes, the National Defense Authorization Act of 2003 amended CERCLA by expanding the entities with which the military departments can negotiate transfer agreements to include "a state or political subdivision of a state and a nonprofit conservation organization that exists for the primary purpose of conservation of natural resources on real property." The legislation requires "the property to be used and maintained for the conservation of natural resources in perpetuity."

The new legislation helps resolve what has been an inherent tension between environmental response actions and conservation. Soil excavation typically required for clearance of UXO can damage the land and the encompassing ecosystem. This legislation now allows municipalities and LRAs (as political subdivisions of states) as well as nonprofit conservation groups to accept the deed to BRAC property before response actions occur, thus enabling the level of response to be tailored to the reuse of the land. The option of early transfer is allowed, although not required. Given the conservation intent, the need for remediation of the land is more limited than in other reuse scenarios. For example, conservation groups may not be interested in full clearance of UXO on the land if such clearance would jeopardize critical habitat or threaten species. Instead, it may be sufficient if hiking trails and swaths of land on either side of them are cleared of UXO.

Other benefits of this legislation are that the nonprofit conservation groups can leverage private and endowment funding to pay for response actions and stewardship costs; they can purchase environ-

mental insurance to manage risks; and they can transfer the property back to a federal or state land management agency. According to proponents of the conservation conveyance legislation, future owners of the land (e.g., a state land management agency) could be insured along with the nonprofit conservation group under the environmental insurance policy, thus alleviating the fear of potential liability (Rubin, personal communication, 2003).

The conservation conveyance is a promising addition to the suite of tools available to the Army and other services. However, it is still too early to know how extensively it will be used, particularly for lands containing UXO. The first and only use by the Army of conservation conveyance to transfer BRAC land occurred at Honey Lake, California, but the UXO portion of the parcel was leased with a furtherance of conveyance rather than being transferred. The expectation is that the land deed will transfer at the end of the lease period.

The ability to enter into short-term and long-term leases has been and will continue to be a useful tool for the Army. Leases are an effective means to get property into the hands of communities while awaiting final transfer. Income generated by leases can defray some of the Army's operation and maintenance costs for BRAC property while the land remains in the Army's inventory.

Although not specifically designed for UXO-containing lands, the acts authorizing early transfer and conservation conveyance represent two of several congressional attempts over the years to improve the efficiency of transferring BRAC properties. More aggressive use of both ETA and conservation conveyance could serve to transfer more of the UXO BRAC land out the Army's inventory.

Three Options for Expediting UXO Land Transfers

Currently available land transfer mechanisms (economic development conveyance, early transfer authority, conservation conveyance), while effective for transferring non-UXO land, do not address core barriers to UXO land transfers. Finding ways to overcome the barriers previously identified should help to expedite the transfer process, regard-

less of the conveyance mechanism used. Given the barriers to transfer revealed in the case studies and survey, RAND Arroyo Center has identified potential government actions for overcoming or avoiding some of these obstacles. Table 4.1 summarizes the possible actions.

Table 4.1
Options for Lowering Barriers to UXO Land Transfers

| Barrier to Transfer | Potential Government Action |
|--|--|
| Lack of UXO information (at the beginning of the disposal process) | <ul style="list-style-type: none"> • Continue to develop database of all UXO information • Clarify incentives for improved information gathering • Obtain reliable UXO information on candidate bases before BRAC selection process |
| Detection technology limitations | <ul style="list-style-type: none"> • Increase funding of UXO detection R&D (at the DoD level, since all services would benefit) |
| Lack of national regulatory standards/protocols for UXO clearance | <ul style="list-style-type: none"> • Improve cost/risk estimation procedures; involve DoD, EPA, states, and stakeholders • Set standards/protocols based on planned reuse scenarios, with contingencies for future changes in reuse; would likely require congressional intervention |
| No standing DoD procedures for UXO clearance | <ul style="list-style-type: none"> • Create DoD-wide or service-specific procedures |
| Regulators' positions about risk | <ul style="list-style-type: none"> • Set standardized UXO clearance protocols based on planned reuse • Increase credibility of risk estimation • Seek congressional guidance on making tradeoffs among explosion risk reduction, costs, and benefits of reuse |
| Public concerns about risk | <ul style="list-style-type: none"> • Improve stakeholder process • Improve risk estimation procedures • Improve risk communication procedures |
| Liability concerns | <ul style="list-style-type: none"> • Limit cost of clearance through decisions earlier in transfer process to limit future uses • Create a reserve fund to cover cost of future UXO discoveries |
| Funding limitations | <ul style="list-style-type: none"> • Increase appropriations for UXO clearance • Improve estimation of clearance costs • Set priorities among sites |

The suggested actions listed in Table 4.1 could be implemented without any major reforms to the existing BRAC land-disposal process. However, the persistent nature of the barriers to transfer suggests that response activities might be more effectively conducted either in a different organizational setting within the Army or in an organization outside of the Army. The nature of the stakeholders with whom the Army must work differs from those that the Army encounters in its mission-oriented activities. Maintaining public trust as the Army strives to divest itself of closed bases while these stakeholders seek to address issues of health, environmental preservation, safety, and economic redevelopment requires a delicate balancing act. This balancing is made more difficult by the potential effect on jobs and prosperity that the impending loss of the Army's presence imposes on the community. Adding further to the situation's complexity is the uncertain nature of funding available for base cleanup and UXO clearance as the Army's budget and priorities change from year to year.

Below we outline three possible ways to mobilize government resources to implement the recommendations in Table 4.1. The options range from incremental changes in the current BRAC land-disposal process to total reorganization of how the government administers the process.

Option 1: Incremental Improvements in the Current Army BRAC Process

As explained below, the Army could make incremental changes to address some of the barriers to UXO land transfer identified in Table 4.1.

Lack of UXO information. The Army is beginning to address some of the information gaps with its new repository, the Army Range Inventory Database (ARID), and with the Army Environmental Database–Restoration (AEDB-R). ARID is a repository for range-related information on both active and closed bases. AEDB-R contains specific UXO information. The Army would need to ensure that its record-retention procedures are consistent with the need for

long-term maintenance of accurate information about historical uses of the land and any incident reports.

Detection technology limitations. Within its existing process the Army could work with the other services to support research and development of integrated detection technologies. DoD total R&D funding for new UXO detection technologies has remained relatively flat over the past decade.

Lack of national regulatory standards/protocols for UXO clearance. Improving national regulatory standards would be difficult under this option. The cleanup process might be improved on an installation-specific basis by attempting to reach an early consensus with the regulators, transferees, and stakeholders on the cleanup and reuse standards for that particular installation. However, improving national regulatory standards would be difficult under this option because the Army lacks the authority and a mandate to do so.

No standing DoD procedures for UXO clearance. The Army's guidance for UXO clearance expired in June 2002. The Army could renew its guidance and more clearly establish and communicate its own standard UXO clearance protocols and procedures to installation managers.

Regulators' positions about risk. Again, the Army could work with EPA and other stakeholders on an installation-specific basis, but far-reaching national changes are unlikely under the current organizational format.

Public concerns about risk. The Army could improve its efforts at communicating risk information to the public. The Army could adopt a proven model of effective public interaction such as the process used by the Air Force Base Conversion Agency.³

Liability concerns. The Army could create a reserve fund to respond to UXO-related incidents. This could alleviate concerns about funding availability among federal receivers as well as private-sector

³ The Air Force's model of addressing community relations appears to have resulted in a smoother BRAC execution process as compared to that of the Army (Lachman, personal communication, 2003).

receivers. However, it would not release the Army from its long-term financial obligations. The Army could also encourage potential transferees to secure environmental insurance to cover future liabilities.

Funding limitations. The Army could develop better estimates of UXO cleanup costs and request additional funding from Congress. Further, the Army could improve priority setting and generate more cost savings from the use of Environmental Services Cooperative Agreements (ESCAs). ESCAs are a mechanism that allows the military department to transfer funds to the property recipient (or its designated contractor) to perform both cleanup and redevelopment. Using an ESCA, the property recipient can purchase environmental insurance to cover cost overruns as well as liability protection from newly discovered contamination (Rubin, 2001).

Option 2: Consolidate Transactional Expertise in Army Headquarters

Rather than limiting itself to incremental changes, under this option the Army would reorganize its management of BRAC land transfers. This would geographically unify its expertise and guidance on the land transfer process within its headquarters rather than continuing to rely primarily on geographically decentralized teams working at each installation. This option would allow core expertise in real estate transactions and regulations to be more easily shared from a central hub at headquarters. This hub could serve as a clearinghouse of information and expertise for installation staff. This approach has the potential to lower the Army's transaction costs and lead to higher cost savings than current practice. The barriers identified in Table 4.1 could be addressed as follows:

Lack of UXO information. The recent development of ARID and the AEDB-R are good beginnings to expanding the knowledge base on the presence of UXO on particular parcels of land. Creating an Army hub for information and expertise on BRAC land transfers has

the potential to more effectively support the case for considering improved UXO information in the BRAC 2005 site-selection process.

Detection technology limitations. Making the case for increased research and development funding would be easier under this option than under the first option because of the increased leverage that a centralized UXO office could provide.

Lack of national regulatory standards/protocols for UXO clearance. Although national standards may not be achieved under this option, this consolidation should lead to the use of a more consistent approach across the Army. This would include a standard toolkit of clearance approaches and a common knowledge base.

No standing DoD procedures for UXO clearance. Renewing the Army's expired guidance on UXO clearance procedures would be easier under this option because of the new hub's central focus on UXO clearance and land transfer.

Regulators' positions about risk. With a more centralized focus, the Army could work with EPA and other stakeholders to establish commonly accepted standards for UXO clearance.

Public concerns about risk. A consolidated headquarters office could create common guidance for community relations. Installation staff could benefit from headquarters' experience in brokering agreements with other communities. The headquarters office would also provide a single point of accountability to stakeholders.

Liability concerns. The same actions can be taken under this option as in option 1, but with a greater likelihood of success. For federal transferees, the Army could create a reserve fund with a readiness-to-respond capability for any UXO-related incidents. Such a cushion should alleviate the liability fears of transferees. The Army could educate potential private-sector transferees on the availability of environmental insurance to cover future liabilities.

Funding limitations. A consolidated headquarters office would make cost estimation and priority setting easier because the office would have authority across the entire Army inventory. This option would also provide greater incentives to extract more cost savings from the use of ESCAs.

To varying degrees, the Navy and Air Force BRAC programs are more centralized than the Army's program. Whether a more centralized process indeed leads to higher transfer rates for UXO-containing lands and a more efficient process is a proposition that can and should be studied.

Option 3: Creation of a Federal Government Corporation (FGC) to Manage Disposition of All DoD Lands

Option 3 would require more dramatic organizational changes. It would take the land disposition responsibility out of the hands of DoD and place it into the hands of a specially chartered organization, an FGC.⁴ Such proposals have been contemplated in the past, but we are not aware of any serious research efforts to explore this option. A 2000 Institute for Defense Analyses (IDA) study recommended that the DoD privatize the processes of cleaning up and transferring land from closed bases, stating:

The most expeditious approach for DoD to divest itself of property and fulfill government commitments to community redevelopment is to integrate cleanup and transfer into a single turn-key operation performed under the auspices of a developer with expertise in environmentally contaminated properties.⁵

IDA cited the slow (and slowing) pace of cleanup and land transfer, the uncertainty of BRAC funding availability, and the inconsistency of processes for cleanup and transfer across BRAC sites as motivations for integrating BRAC processes under a single entity. Further, the

⁴ We provide only a brief overview of the FGC concept here. Appendix B provides additional details. The feasibility of the FGC concept would need additional, careful study before making any decision to implement it.

⁵ M.C. Bracken, E.T. Morehouse, Jr., and R.R. Rubin, *Issues and Alternatives for Cleanup and Property Transfer of Base Realignment and Closure (BRAC) Sites*, IDA Paper P-2528, Alexandria, VA: Institute for Defense Analyses, 2000.

IDA research team recognized that the tasks of working with local redevelopment authorities and environmental regulators to prepare and transfer land for non-DoD use are activities that are outside of DoD's core mission areas, particularly when economic redevelopment and job creation are goals. Thus, it might be argued that these matters would be better addressed in an organization that comprises the appropriate sets of expertise and incentives.

Another motivation for exploring alternatives to the current process for base cleanup and transfer lies in the business-like nature of real estate transactions that form the heart of this activity. Making the most of the private marketplace and using market incentives to help guide and prioritize land cleanup and transfer are well suited for corporation-like organizations; these forces are typically muted, if present at all, in standard government agencies (Held et al., 2002, pp. 55-77).

Privatization is not necessarily the most desirable route for DoD to take to deal with transferring BRAC land, due primarily to the fact that significant public investments will probably have to be made to remove UXO and other environmental contamination. Further, there are public-interest factors, such as assistance in the economic redevelopment of the affected communities, that purely private organizations are not well positioned to handle. That said, other middle-ground options exist that incorporate many of the principles of process integration, private markets, and appropriate core competencies.

The alternative approach of establishing a federal government corporation seems to hold considerable potential for successfully bringing to bear the proper set of organizational capabilities and incentives to improve the efficiency and effectiveness of converting closed bases to other uses. The primary justification for such an entity is that it could do things that the Army cannot do well. For example, it could establish a critical mass of expertise in complex real estate transactions, redevelopment, and remediation within one coordinated operation. It could further remove the Army from the inherent conflict between wanting to dispose of lands expeditiously to realize savings and taking the steps necessary to secure sound economic redevelopment plans and adequate environmental safeguards.

Earlier RAND Arroyo Center research explored the application of the FGC concept for spinning off such Army activities as R&D laboratories and maintenance depots (Held et al., 2002). The research noted the efficiency incentives inherent to the corporation model when dealing with business-like transactions, and also discussed how the flexible FGC chartering process can create appropriate oversight structures and nonmarket types of incentives to ensure that public interest goals are pursued as well.

In the case of the Army's challenge of transferring BRAC land, the key activity is the sale or other transfer of land to entities outside DoD, with the accompanying covenants and liabilities that are a part of many real estate transactions. Further, if the proceeds from these land sales can be used to at least assist in the cleanup of UXO and other environmental contamination, a powerful incentive structure could be established to minimize the impact of remediation on the federal budget.

As mentioned, the FGC concept is not new as a possible vehicle for the disposition of closed military bases. In fact, a government-owned FGC, the Presidio Trust, was created by Congress in 1996 to facilitate the management of the Presidio of San Francisco, a particularly complex closed base.⁶ The FGC concept may hold the potential for dealing with the complexities of closed-base land cleanup and transfer on an Army-wide and, even more usefully, on a DoD-wide scale. Although a detailed benefit-cost assessment is beyond the scope of this study, we believe it would be worthwhile for the Army to lead a DoD-wide exploration of the concept in more detail to determine whether it is in DoD's interest to ask Congress to create an FGC as a single organization to take title to and dispose of land—including land containing UXO—on closed bases.

An example of an FGC with many parallels to these activities is the Resolution Trust Corporation (RTC). The RTC came into being in 1989 and was established to deal with the large number of savings

⁶ 16 U.S.C., Section 460bb appendix (originally enacted as Title I of H.R. 4236, P.L. 104-333, 110 Stat. 4097, on November 12, 1996).

and loans failures in place of the insolvent Federal Savings and Loan Insurance Corporation. Once its job was finished, the RTC ceased to exist. In its more than six-year history, the RTC's three main roles were to act as conservator of insolvent thrifts, to take control of their operations until the best method for resolution could be determined, and to be the receiver of insolvent thrifts, taking action to maximize the claim recovery of the thrift's creditors (including itself) (Federal Deposit Insurance Corporation, 1998, pp. 6-7). In the execution of these roles, the RTC was required by its enabling legislation to "maximize the net present value return from the disposition of failed thrifts and their assets . . . minimize the effect of such transactions on local real estate and financial markets, and . . . maximize the availability and affordability of residential real property for low- and moderate-income individuals," missions that are, to some extent, mutually contradictory (Federal Deposit Insurance Corporation, 1998, p. 8). The RTC was staffed with experts in all aspects of land transaction and asset management.

This set of mixed missions is analogous to the Army's land transfer process: the Army has a mission to transfer surplus land outside DoD, a distinctly private-sector-like activity, while simultaneously addressing environmental and economic redevelopment issues as well as a homeless assistance requirement that is similar in spirit to that of the RTC.

The analogy extends beyond dual missions, however. Like land on a closed military base, the assets assumed by the RTC were mixed in quality. Some were pure assets, including real estate holdings (some of which were substandard or contained environmental hazards). Others had liabilities (such as liens and judgments) associated with them. The RTC was successful in using the private market to dispose of assets, loans, and mortgages as well as to manage liabilities. It resolved \$402.6 billion in S&L/thrift failures at a cost of approximately 22 percent of that figure (Federal Deposit Insurance Corporation, 1998, p. 49).

Likewise, land on Army bases is mixed in quality. Some is developed, and some is undeveloped. Some parcels contain UXO and must be cleared before use, while other parcels do not. Regardless,

since the processes involved here revolve around the business transactions of contracting for land surveys and clearance and transferring real estate to other parties, a business corporation that can be established for that purpose seems an appropriate mechanism for achieving efficiency and innovation after a base closure.⁷

The RTC's core function was to receive assets and liabilities from failed or failing savings and loans, resolve the failures in a least-cost manner, and then reintroduce the assets into the private sector. A potential Defense Land Trust Corporation (DLTC) could be created by Congress to carry out similar functions: to receive land and property assets from closed military bases, resolve any environmental or UXO liability issues, and transfer those assets to users outside DoD. Because of its cost-minimization incentives and freedom of operation, the RTC was able and willing to be extremely innovative in the procedures it used to accomplish thrift resolutions. Sometimes the RTC sold whole thrifts immediately if appropriate buyers were available, but other times it held assets (if, for example, real estate values seemed temporarily depressed). In some cases, it creatively packaged assets ("putting" liabilities with concrete assets in some cases, creating securities markets to facilitate the disposal of less-secure mortgages, underwriting or guaranteeing some liabilities, or splitting up multi-branch thrifts to increase the pool of potential bidders). In short, the RTC was able to deal with each asset/liability pool it encountered with an appropriate disposal strategy that fit with the RTC's set of incentives and responsibilities. This capability proved to be important to the RTC's effectiveness, as each thrift resolution came with its own set of problems and complexities. Such flexibility and incentives for innovation seem important to the process of effectively transferring land on closed Army bases, as well.

⁷ Congress has the authority to establish federal government corporations. Thus, if the FGC concept is one that DoD would wish to pursue after further study, it must approach Congress to make the case for such an entity. In the chartering process, Congress has the flexibility to set the terms of an FGC's structure, tasks, and privileges. These are details that would presumably be part of the recommendations of a future study.

Potential Disadvantages of an FGC Solution

While an FGC such as the proposed DLTC seems to have some notable advantages, it is important to examine potential drawbacks that may be associated with transferring the functions discussed to such an organization. By removing responsibility for cleaning up environmental and UXO contamination from the service that created it, the creation of a DLTC may remove incentives that the services may have to address contamination problems themselves—or to limit such contamination in the future. At the very least, removing the UXO clearance account from the source of the UXO contamination makes it more difficult for the services to balance training requirements with the potential danger that training may pose to future land users.

In a 1995 article in the *Illinois Law Review*, Michael Froomkin discusses the accountability problems of some FGCs, which can enjoy the benefits of their government associations to shield themselves from market forces while using their non-government-agency status to avoid federal oversight (particularly when the FGC is entirely privately held or when it is only minority-owned by the government) (Froomkin, 1995). These cases can be troublesome, as they can lead to returns accumulating to private parties as a result of public investment.⁸ Avoiding these undesirable outcomes requires careful organizational design; for example, given the public-benefit nature of base-closure goals, and the public source of the assets being improved and transferred, it is probably not appropriate for Congress to create an FGC that is not at least majority-owned by the U.S. government. Getting the public-private mix right and establishing effective mechanisms for incentive creation are difficult tasks, requiring a delicate balance between enhanced flexibility and organization agility on one hand, and proper oversight and accountability on the other. FGCs seem to have a great deal of promise in facilitating BRAC

⁸ This investment can be direct (in the case of a federal appropriation) or indirect (in the case of a mortgage-backed securities clearinghouse, such as Fannie Mae, being able to borrow more cheaply due to an implied, but not explicit, guarantee of the federal government).

transfer processes, but designing the correct form for such a corporation is not easy.

How the FGC Option Would Resolve Land Transfer Barriers

As the case studies discussed in this report revealed, each base closure presents a unique set of stakeholders, future uses, and contamination problems. Clearly, many of the creative means used by the RTC for thrift resolution are simply not feasible for the Army, whose primary incentive is to transfer the land in question as expeditiously as possible. Any experimentation that might unduly delay that transfer is quite rightly eschewed in the current system. In addition, the BRAC land-disposal process is currently tightly constrained by BRAC legislation. An FGC would need relief from some of these constraints, particularly if it would be expected to raise funds from land sales.

An independent FGC seems an appropriate mechanism for ensuring a cleanup and transfer process in which all relevant interests can be appropriately involved and protected. Congress could establish oversight and governance measures that facilitate processes that focus on whatever mix of economic redevelopment, environmental restoration, recovery of land and property value, public benefit usage, etc., it deems appropriate. Getting this mix right can be especially important where early transfer of lands is considered; in such cases, close and timely coordination of all stakeholders is vital.

Finally, it is worth noting that being able to turn to an FGC with the appropriate mission and expertise to deal with the inherent challenges of this type of activity can be just as useful for the other services as it can for the Army. Thus, while this discussion has focused on the Army BRAC-UXO problem, the proposed creation of an FGC to address this problem also has the potential to be applied to other DoD activities involving real estate transactions.

More specifically, an FGC would address the barriers to transfers identified in Table 4.1 in the following ways:

Lack of UXO information. The market orientation of this option would provide built-in incentives to improve UXO information. Improved information about UXO would have monetary value because it would accelerate the land transfer process.

Detection technology limitations. The market orientation of this option embeds incentives to invest in new technology. With improved detection technology, an idle property could be converted to valuable real estate. Revenues generated from land sales could fund R&D.

Lack of national regulatory standards/protocols for UXO clearance. Since all DoD BRAC lands would be disposed of by the FGC, standardization and consistency across all services' lands would be achievable.

No standing DoD procedures for UXO clearance. As noted above, this option would create a strong incentive to standardize procedures for managing UXO clearance across installations, regardless of service.

Regulators' positions about risk. Regulators and stakeholders would most likely view an FGC as more accountable and transparent in risk estimation and UXO clearance standards than the Army.

Public concerns about risk. The FGC could create standard operating procedures for communicating with communities and present a single point of contact and accountability to stakeholders. The FGC is potentially more effective than the other two options because it would be seen as a credible third party.

Liability concerns. Like the other options, the FGC could create a reserve fund for federal receivers with a readiness-to-respond capability to alleviate liability concerns and exploit private-sector tools such as environmental insurance for private-sector receivers. However, the FGC would have substantially more leverage because of its dominant role in the market.

Funding limitations. Under an FGC, UXO cleanup would not have to compete directly with other, mission-critical military funding needs. It is possible that under this option, Congress would substantially increase the budget for UXO cleanup. Similar to the other options, an FGC could improve cost estimates for UXO cleanup. Further, the FGC could have the added benefit of using land revenues to offset operational costs, assuming some relief from the current constraints on BRAC land disposal. Its efforts at priority setting could be more effective because its portfolio of properties would be larger, and

it would have the flexibility to bundle properties or hold properties pending more favorable economic conditions. Its size in the market could allow the FGC to increase cost savings from ESCAs.

Summary

The three options discussed in this chapter suggest that the Army can take steps to overcome what have traditionally been barriers to transferring UXO land. The level of investment the Army can make ranges from incremental process changes to the existing BRAC operations, to creating a more centralized management hub within the Army headquarters, to leading the DoD effort to transfer the responsibility of disposition of lands outside of DoD to an FGC.

These options are not mutually exclusive. Option 1 could be exercised immediately while Options 2 and 3 are considered for the future.

Summary of Findings and Recommendations

The goal of the Army BRAC program is to expedite the transfer of BRAC lands from its inventory and generate significant cost savings to apply to mission requirements. Evidence to date has shown that when UXO is present, the Army's ability to transfer BRAC lands has been problematic. The difficulties do not arise from any fundamental flaws in the Army's management of this problem. Rather, cleanup and reuse of land contaminated with UXO is an extraordinarily difficult problem, regardless of who is in charge.

Findings

RAND Arroyo Center collected data on 26 major Army BRAC installations that account for 82 percent of the acreage of Army BRAC land. Overall, about 57 percent of the acreage slated for disposal at these installations is affected by UXO, but only about 10 percent of this UXO-affected acreage has transferred outside the DoD (and almost all of that was transferred via special legislation from Congress for Fort Meade). By contrast, 61 percent of the acres not containing UXO have transferred out of the military.

To identify factors that have contributed to the successful transfer of UXO-containing land, we conducted case studies at nine installations from our list of 26 where UXO land has been transferred. For each installation, we reviewed historical documents and conducted structured interviews with individuals knowledgeable

about the transfer process. They included installation officials, representatives from the Environmental Protection Agency, state regulators, and individuals directly involved with local redevelopment authorities. Our interview group did not include private developers.

The case studies indicated that, as of the completion of our data-collection efforts in May 2003, at Fort Ord, Fort Ritchie, and Jefferson Proving Ground, less than 1 percent of UXO land had transferred. More than 90 percent of UXO land had transferred at the Presidio of San Francisco, Fort Sheridan, Fort Devens, Fort Meade, and Fort McClellan. The lands at the Presidio, Fort Meade, and Fort McClellan were transferred by an act of Congress. Only Fort Devens and Fort Sheridan transferred significant amounts of UXO BRAC land using normal Army disposal procedures.

From the case studies, we concluded that installations where the Army has been able to transfer UXO-affected land *without direct intervention from Congress* share the following characteristics:

- low UXO density,
- small number of property recipients (thus limiting the number of people involved in the negotiations),
- financial incentives (either high land value or special tax and other benefits provided by the state and local governments), and
- use of special regulatory procedures, such as “time-critical removal action” (which allows for action without EPA review beforehand).

We also heard from a number of individuals involved in the BRAC land transfer process and in the review of this report that the successful transfer of former military land depends on the negotiating skills of those involved. Further, these individuals indicated that the degree of trust that the involved environmental regulators and citizens have in the transfer process can play a critical role.

To gain a more precise understanding of the barriers to the transfer of land containing UXO, Arroyo conducted a formal survey of individuals involved at each of the installations from our database of 26 where UXO is present (except for the Presidio of San Francisco,

where the presence of UXO was unknown when the land was transferred). The survey specifically sought information related to UXO and not other forms of contamination. In the survey, the most commonly cited causes of delay in UXO land transfer were the following:

- lack of information about UXO locations, quantities, and types before land-reuse decisions are made;
- inability of detection technologies to ensure that all UXO items have been located and removed;
- lack of accepted standards for UXO cleanup;
- differences between regulators and the Army about acceptable risks of UXO;
- land recipients' fear of being held liable for UXO incidents;
- public concerns about UXO risks;
- lack of standard DoD operating procedures for UXO clearance and land transfer; and
- lack of funding to complete UXO remediation.

Since the BRAC process was initiated, Congress has made several procedural changes to facilitate the transfer of surplus properties. The application of economic development conveyances, public benefit conveyances, and early transfer authority have all been attempts to expedite the land transfer process. These mechanisms appear to have reduced the transfer times for non-UXO BRAC lands but do not appear to have had a detectable effect on UXO transfer times.

Early transfer authority permits land to be conveyed before environmental response and UXO clearance actions have occurred, allowing cleanup and reuse to be more complementary. Although this authority has been available since 1996, it has been applied only a handful of times to lands containing UXO. In most of those cases, low UXO density and restricted land use facilitated the use of the authority.

More recently, Congress passed the conservation conveyance legislation as a means of enabling land transfers to nongovernment entities that would restrict public access in the name of preserving lands with enduring ecological value. It is too soon to know whether

this mechanism will be effective for transferring lands containing UXO. In the first and only use by the Army of conservation conveyance to transfer BRAC land (which occurred at Honey Lake, California), the UXO portion of the parcel was leased rather than being included in the transfer.

Recommendations

A key question is whether use of early transfer authority and promotion of conservation conveyances will be sufficient to break the logjam on transfers of BRAC lands containing UXO. Based on our case studies and survey of key participants in the BRAC process at sites containing UXO, we believe that alternative approaches merit consideration.

The Army could institute a number of incremental changes to help address some of the difficulties of UXO land transfer. These actions include improving baseline information about UXO presence on BRAC lands, establishing robust response action protocols, and clarifying administrative procedures. Table 4.1 listed additional potential changes. The Army has already initiated measures—in response to a congressional directive—to improve its inventory of UXO-containing lands.

While incremental changes to the existing BRAC land transfer process may alleviate some of the problems, the persistent difficulties with UXO cleanup and land transfer suggest that a fundamentally different approach may be needed in the long run. Further, the land-disposal process diverts the Army from its core national defense mission. One option is to create a BRAC land transfer hub at Army headquarters to centralize expertise and management. However, this would not address the issue of the land transfer process tying up resources that otherwise could be used for core Army activities. Another option is to move the disposal process outside of the Army into a federal government corporation that can more effectively leverage market forces to dispose of UXO and non-UXO lands—not just for the Army but for the other services as well.

The Army should consider the following recommendations to address barriers to the transfer of existing UXO-containing BRAC inventory and the prospective transfer of new BRAC UXO lands in BRAC 2005:

In the short term, change current Army procedures incrementally. Helpful changes would include improving characterization of UXO occurrence on BRAC lands before decisions about reuse, clarifying UXO clearance protocols, and developing improved estimates of UXO cleanup costs.

Continue the efforts to improve information about UXO occurrence. The Army is making significant progress in this direction with the ARID and AEDB-R databases, and work on these databases should continue. Better information about UXO locations is critical to virtually every other action that could be taken to improve the transfer process.

Explore an alternative management approach that would unify and integrate expertise and guidance on the land-disposal process within Army headquarters. This step has the potential to lower the Army's transaction costs and lead to greater cost savings than the current approach. To this end, a comparative study should be conducted on the Army, Navy, and Air Force BRAC processes to ascertain whether a more centralized approach could lead to improved cost savings and higher transfer rates for UXO.

Take the lead in working with the other services and the Office of the Secretary of Defense to conduct an in-depth study of the concept of a federal government corporation. Such an organization would handle all transfers of excess DoD lands—with and without UXO—from former and future BRAC rounds.

Specifically for the BRAC 2005 selection process, account for the presence of UXO in making final closure decisions. Establish procedures to ascertain the value of acquiring additional information about environmental contamination and UXO at candidate installations before final decisions are made. Some of the installations might be prime candidates for conservation conveyance transfers rather than other reuse options. Such knowledge upfront could lead to more realistic expectations, greater cost savings, and faster transfers.

These recommendations could have immediate effects on the ongoing BRAC land transfers from the previous rounds. Further, beginning to implement them and evaluating their impacts on the current land inventory would strengthen the Army's position to implement BRAC 2005 more efficiently and effectively.

APPENDIX A

Land Transfer Data for Selected Army BRAC Installations

This appendix summarizes the data on transfer of land at Army bases closed under BRAC that were gathered for this project. The data were obtained from a combination of written reports, information requests to the bases, and interviews with base personnel. They represent land transfers through May 2003.

70 Transferring Army BRAC Lands Containing Unexploded Ordnance

| Installation Name | BRAC Date | Closure Date | Total Acres | Closed Acres Transferring Outside DoD | UXO Acres | Non-UXO Acres | UXO Acres Transferred | Non-UXO Acres Transferred | Year of Transfer for UXO Land (Acres) | Year of Transfer for Non-UXO Land (Acres) |
|---|-----------|--------------|-------------|---------------------------------------|-----------|---------------|-----------------------|---------------------------|---------------------------------------|--|
| Army Research Laboratory—Watertown (MA) | 1988 | 1994 | 48 | 48 | 0 | 48 | 0 | 48 | NA | 1998 (37) 2002 (11) |
| Bayonne Military Ocean Terminal (NJ) | 1995 | 1999 | 679 | 679 | 0 | 679 | 0 | 652 | NA | 2001 (460) 2002 (192) |
| Cameron Station (VA) | 1988 | 1995 | 164 | 164 | 0 | 164 | 0 | 164 | NA | 1996 (164) |
| Fitzsimons Army Medical Center (CO) | 1995 | 1999 | 579 | 557 | 0 | 557 | 0 | 544 | NA | 1998 (87.6) 1999 (103.1) 2001 (152.9) 2002 (144.4) 2003 (56.2) |
| Fort Benjamin Harrison (IN) | 1991 | 1995 | 2,501 | 2,370 | 0 | 2,370 | 0 | 2,358 | NA | 1995 (303) 1996 (327.7) 1997 (3.3) 1998 (65.2) 1999 (207.2) 2002 (1.49) 2003 (1,450) |
| Fort Chaffee (AR) | 1995 | 1997 | 71,758 | 7,030 | 0 | 7,030 | 0 | 6,754 | NA | 2000 (3,793) 2001 (1,751) 2002 (962) 2003 (248) |

Land Transfer Data for Selected Army BRAC Installations 71

| Installation Name | BRAC Date | Closure Date | Total Acres | Closed Acres Transferring Outside DoD | UXO Acres | Non-UXO Acres | UXO Acres Transferred | Non-UXO Acres Transferred | Year of Transfer for UXO Land (Acres) | Year of Transfer for Non-UXO Land (Acres) |
|--------------------------|------------|--------------|-------------|---------------------------------------|-----------|---------------|-----------------------|---------------------------|--|--|
| Fort Des Moines (IA) | 1988 | 1994 | 83 | 50 | 0 | 50 | 0 | 50 | NA | 1994 (50) |
| Fort Devens (MA) | 1991 | 1996 | 9,300 | 4,120 | 623 | 3,497 | 578 | 3,340 | 1997 (210) 1999 (368) | 1996 (2,356.6) 1997 (273.2) 1999 (468) 2000 (17.2) 2002 (94) 2003 (131.4) |
| Fort Dix (NJ) | 1995 | 1997 | 32,000 | 224 | 12 | 212 | 0 | 0 | NA | NA |
| Fort Douglas (UT) | 1988 | 1991 | 68 | 51 | 0 | 51 | 0 | 51 | NA | 2001 (51) |
| Fort Meade (MD) | 1988 | 1995 | 13,309 | 8,470 | 8,470 | 0 | 8,470 | 0 | 1991 (7,600) 1993 (500) 2001 (347) | NA |
| Fort Holabird (MD) | 1988, 1995 | 1996 | 21 | 21 | 0 | 21 | 0 | 21 | NA | 1997 (6.6) 2002 (13.9) |
| Fort Indiantown Gap (PA) | 1995 | 1998 | 19,200 | 2,500 | 0 | 2,500 | 0 | 2,500 | NA | 1998 (2,500) |
| Fort McClellan (GA) | 1995 | 1999 | 41,174 | 18,619 | 5,818 | 12,802 | 20 | 5,141 | 2001 (20.3) | 2000 (1,306.5) 2001 (617.8) 2002 (3,216.6) |

72 Transferring Army BRAC Lands Containing Unexploded Ordnance

| Installation Name | BRAC Date | Closure Date | Total Acres | Closed Acres Transferring Outside DoD | UXO Acres | Non-UXO Acres | UXO Acres Transferred | Non-UXO Acres Transferred | Year of Transfer for UXO Land (Acres) | Year of Transfer for Non-UXO Land (Acres) |
|-------------------------------|-----------|--------------|-------------|---------------------------------------|-----------|---------------|-----------------------|---------------------------|---------------------------------------|--|
| Fort Ord (CA) | 1991 | 1994 | 28,000 | 28,000 | 12,000 | 16,000 | 72 | 11,482 | 2001 (72) | 1994 (1,666) 1995 (849) 1996 (7,262) 1997 (475) 1998 (76.5) 1999 (24.7) 2000 (244) 2001 (16.2) 2002 (771) 2003 (76) |
| Fort Pickett (VA) | 1995 | 1998 | 45,160 | 2,863 | 0 | 2,863 | 0 | 2,832 | NA | 2000 (1,608) 2002 (1,184) 2003 (40) |
| Fort Ritchie (MD) | 1995 | 1998 | 615 | 591 | 364 | 227 | 0 | 0 | NA | NA |
| Fort Sheridan (IL) | 1988 | 1993 | 712 | 406 | 86 | 320 | 86 | 320 | 2001 (86) | 1997 (320) |
| Jefferson Proving Ground (IN) | 1988 | 1995 | 55,264 | 55,264 | 53,494 | 1,770 | 100 | 1,372 | 2001 (100) | 1996 (221) 1997 (35) 2001 (1,107) 2002 (5) 2003 (4) |

| Installation Name | BRAC Date | Closure Date | Total Acres | Closed Acres Transferring Outside DoD | UXO Acres | Non-UXO Acres | UXO Acres Transferred | Non-UXO Acres Transferred | Year of Transfer for UXO Land (Acres) | Year of Transfer for Non-UXO Land (Acres) |
|--------------------------------|------------|--------------|-------------|---------------------------------------|-----------|---------------|-----------------------|---------------------------|---------------------------------------|--|
| Lexington Facility (KY) | 1988 | 1995 | 788 | 788 | 0 | 788 | 0 | 788 | NA | 2001 (210) 2002 (578) |
| Oakland Army Base (CA) | 1995 | 1999 | 426 | 400 | 0 | 400 | 0 | 400 | NA | 2002 (385) 2003 (15) |
| Presidio of San Francisco (CA) | 1988, 1993 | 1994 | 1,480 | 1,480 | 17 | 1,463 | 17 | 1,463 | 1994 (17) | 1994 (1,463) |
| Sacramento Army Depot (CA) | 1991 | 1995 | 487 | 406 | 0 | 406 | 0 | 357 | NA | 1995 (305) 1998 (27.9) 2000 (16.9) 2002 (7.7) |
| Savanna Army Depot (IL) | 1995 | 2000 | 13,062 | 13,062 | 5,590 | 7,472 | 0 | 0 | NA | NA |
| Seneca Army Depot (NY) | 1995 | 2000 | 10,594 | 10,594 | 3,255 | 7,339 | 0 | 1,045 | NA | 2000 (1,039) 2001 (6) |
| Vint Hill Farms Station (VA) | 1993 | 1997 | 701 | 701 | 0 | 701 | 0 | 701 | NA | 1999 (701) |
| TOTALS | | | | 159,459 | 89,729 | 69,730 | 9,343 | 42,383 | | |

Exploring the Potential of the FGC Concept for BRAC Lands

Introduction

In Chapter Four of the main text, we discussed significant barriers to the transfer of land containing unexploded ordnance, as well as some potential actions that could be taken at various levels in order to overcome those barriers. In particular, there were actions that the Army could undertake to address each barrier separately; additionally, there were issues of scale and organizational continuity that could be resolved by the consolidation of the Army's BRAC offices and activities into a single organization within the Army headquarters—or even by the consolidation of all DoD BRAC activities into a single department-wide office.

There are challenges associated with the BRAC land transfer process, though, that are not addressed through these measures. These challenges stem from

- the economic and business-transaction aspects of land transfer activities,
- the noncore nature of land cleanup and transfer within the Army, and the associated difficulty in assembling and retaining teams of environmental and real estate experts to administer relevant processes, and
- the regulatory/bureaucratic approach to the land cleanup and transfer process.

These organizational barriers, in part a consequence of program constraints imposed by Congress, result in land transfer processes that are not responsive to economic opportunity, are not carried out by personnel especially trained and experienced in real-estate-relevant areas, and are not able to innovate to create value or optimize cleanup and transfer decisions for long-term benefit. Additionally, when Congress has intervened in the BRAC process and transferred land through legislation, they are not seeking to optimize economic assets.

As described in the text, a federal government corporation has the potential to bring an appropriate organizational form and set of economic and public-interest incentives to bear to address this set of challenges. The purpose of this appendix is to describe some of the potential that an FGC could bring to the BRAC process. It is important to note that, for the purposes of this report, only an initial exploration of the FGC concept was conducted—neither the time nor the resources were available to prepare a full cost-benefit analysis of such a concept, nor to scope the potential costs (or cost savings) that the creation of such a firm may bring about. One of the recommendations of this report is to carry out a detailed study of the FGC option, including the many ways that it could be chartered and implemented.¹ As we will discuss, the creation of an FGC, while by no means rare, is not trivial—getting the structure and charter right requires careful study and consideration, and is critical to ensure that the FGC is able to accomplish the tasks for which it is formed.

A Notional Defense Land Trust Corporation

To gain a better understanding of the implications of setting up an FGC to deal with these processes, it is useful to think about how such an organization might approach its underlying activities. Note that

¹ To our knowledge such a detailed study of the FGC concept for BRAC has not been done, despite the fact that FGC creation, or at least concentration of BRAC land transfer into a single agency, has been discussed for several BRAC rounds.

although some of the functions described below could be carried out under existing mechanisms, no current approach captures the full organizational benefit of an FGC. In this alternative process, let us hypothesize that a federal government corporation, the Defense Land Trust Corporation (DLTC), has been created to take in land from closed military bases from BRAC, prepare it for transfer, and transfer it to appropriate public and private interests.² In the case of an Army-related BRAC closure, DLTC would receive land from the Army immediately upon termination of Army base operations, much like the Resolution Trust Corporation (RTC) received assets from failed savings and loans for subsequent resale to the private sector.

Once land on a closed base is transferred to DLTC, the corporation would become responsible for administering and maintaining the land,³ unless national security reasons exist for the Army to continue this function. In such national security cases, transfer to DLTC could still take place, but the Army may partner with DLTC in providing necessary security and secure clearance activities.⁴ Along with the property, accompanying liabilities, such as environmental and UXO contamination, including the presence of depleted uranium and associated NRC/DOE licenses, would be transferred as well.

DLTC Functions

Once in possession of a closed base, DLTC could perform the same functions that the individual installation BRAC offices currently perform, and probably with more efficiency. To facilitate its mission, DLTC would need to partner with the relevant services to ensure that all required information with regard to the presence of environmental

² Consistent with our earlier observation that such an FGC has potential beyond the Army, we propose an FGC to manage all DoD base closures and surplus land transfers. The particular process discussed in this section focuses on an Army BRAC case, but similar processes for Navy or Air Force base closures could be imagined.

³ Activities may include providing security, maintaining infrastructure, etc.

⁴ For example, such might be the case if classified weapons testing took place on the base in question, and associated UXO needed to be removed in a secure manner.

contamination and UXO is available as early as possible in the process so that appropriate decisions about future use and cleanup and clearance planning can be made. DLTC could (and probably should) begin the data-collection process even before base closure, working with base officials and the Army Corps of Engineers to establish effective procedures and standards for the collection and transfer of data.

DLTC would also form partnerships with other federal agencies as well as the communities that would be potential recipients of former military land. DLTC could also partner with the appropriate regulatory bodies, such as EPA and state environmental offices, to establish a consistent certification process by which land is deemed suitable for its reuse purpose. Under the current system, this process is created from scratch almost every time because each installation BRAC office is new to the system, with a new set of players performing the negotiations.

Assuming that relevant statutes were amended upon creation of the DLTC, the existing legal authority to conduct transfers using early transfer authority and conservation conveyance could be used to facilitate the cleanup and transfer of property. Like the Army and the other services, DLTC could negotiate to transfer cleanup responsibility along with the land, or it could retain the cleanup responsibility and contract to have the land cleared at its cost. The partnerships formed by DLTC and its role as a disinterested facilitator of efficiency and public interest could lead to a smoother and faster cleanup and transfer process. Further, since the DLTC would seek to obtain fair-market value for the transferred land, the establishment of fair-market values becomes a useful prioritization mechanism for investments in cleanup and clearance.⁵

⁵ Since current transfers are not conducted via a competitive process designed to recoup maximum return for land, such market value is typically determined by appraisal. However, should DLTC be tasked to maximize returns on land, perhaps to maximize the funds available from nontaxpayer sources to clean up UXO and other base contamination, fair-market value may be set directly by the market.

DLTC could work to optimize these processes across the full range of base closures, maintaining a single repository of lessons learned and best practices that could carry over from base to base and from BRAC cycle to BRAC cycle. If desired, DLTC could be a limited-term organization like the RTC. With a sunset provision, DLTC could open in anticipation of a BRAC round, carry out the activities described above, and then close once all lands were transferred.

Other Possible DLTC Functions

DLTC could initiate and fund research and development in advanced UXO remediation technologies, or in other methods that would make its future activities more efficient. As a public corporation, DLTC could be empowered to issue bonds to assist local authorities in their redevelopment efforts (as a public entity, DLTC would have access to cheaper financing than would private organizations). The extent of DLTC's involvement in such activities would be determined by the particular charter and mission granted by Congress. DLTC may seek to open up real estate opportunities by engaging in creative land packaging, enlarging the bidder pool, developing alternative risk and liability management mechanisms to enhance the attractiveness of BRAC assets, and other innovative actions. The degree to which DLTC would be required to hold property would depend on the amount of non-land-proceeds funding available for cleanup and UXO clearance.⁶

Paying for UXO Clearance via an FGC

The question of how UXO response and clearance costs should be distributed is a question of public policy best answered by Congress. Currently, the armed services bear the costs of cleanup as the agents

⁶ Currently, some UXO lands are in what amounts to a long-term conservatorship; at Jefferson Proving Ground, some 50,000 acres of land on the base's former firing range were considered too contaminated with UXO to be cleaned up. Although the Army maintains control of the land, it is administered and secured by the U.S. Fish and Wildlife Service as a wildlife refuge (see Appendix J).

responsible for UXO presence. However, recipients of transferred property may be willing to assume some of these costs if they do not exceed the value of the property in its intended use; also, it may be desirable that the public portion of the burden of UXO cleanup be accounted for outside of DoD. Such a shift could lead to a more stable funding stream for clearance activities, especially if tied to an organization like DLTC with the independence and flexibility to effectively leverage those public dollars. Further, concentration of cleanup and transfer activities into a single-purpose FGC would increase the transparency of the true cost of UXO clearance.

Potential Disadvantages of an FGC Solution

Although an FGC such as the proposed DLTC seems to have many advantages, it is important to examine potential drawbacks that may be associated with transferring the functions discussed to such an organization. By lifting the responsibility for cleaning up environmental and UXO contamination from the service that created it, the creation of a DLTC may remove any incentives that the services may have to address contamination problems themselves—or to limit such contamination in the future. At the very least, removing the UXO clearance account from the source of the UXO contamination makes it more difficult for the services to balance training requirements with the potential danger that training may pose to future land users.

That said, it is questionable whether such a tradeoff calculation is done in the current system. It may in fact be possible for an organization with a specific mission and expertise to create a fee structure that would in fact create proper incentives for the services where none exist today. One could imagine a fee structure similar to that of banks that purchase FDIC insurance, in which the services would pay a fee at the time of ordnance use designed to defray potential future cleanup costs.⁷

⁷ Care must be taken in the design of such a system; such a fee must be seen as part of the real cost of training, and not as a deterrent to training.

FGCs can create accountability problems, because they can use the benefits of their government associations to shield themselves from market forces while also using their non-government-agency status to avoid federal oversight (particularly when the FGC is entirely privately held, or when it is only minority-owned by the government) (Froomkin, 1995). These cases can be troublesome, as they can lead to returns accumulating to private parties as a result of public investment.⁸ Avoiding these undesirable outcomes requires careful organizational design. FGCs seem to have a great deal of promise in facilitating BRAC transfer processes, but designing the correct form for such a corporation is not easy.

Observations and Conclusions

We have postulated the creation of a federal government corporation, the Defense Land Trust Corporation, to take over the responsibilities of the Army and the other services for cleaning up and transferring lands on closed bases to non-DoD users. For the services, such a change would have the obvious benefit of immediately removing these properties from their inventories, allowing them to focus their personnel and resources on their core missions. From a federal government perspective, a DLTC could be an effective way to ensure that all public interests, from economic redevelopment to environmental restoration, are appropriately balanced in the disposal of these lands. Further, a DLTC would have available a range of incentives and mechanisms to reduce and spread the burden of the cost of former base cleanup to the appropriate parties.

From an efficiency point of view, a DLTC would be able to prioritize efforts based on cost, benefit, land value, potential for cheaper future cleanup, and other factors deemed relevant by DLTC's charter

⁸ This investment can be direct (in the case of a federal appropriation) or indirect (in the case of a mortgage-backed securities clearinghouse, such as Fannie Mae, being able to borrow more cheaply due to an implied, but not explicit, guarantee of the federal government).

and leadership. Unlike the military services, DLTC can take the longer-term view, optimizing at a systems level across time rather than planning for each BRAC round and each closed base separately.

A DLTC would be able to assemble and retain relevant expertise in real estate markets, contract management, economic redevelopment, finance, and environmental regulation and management, all of which are important in post-base-closure activities—and none of which are core service competencies, with the exception of contract management.

Finally, Congress would have the ability to write mission guidance into DLTC's charter that reflected the nation's priorities for the reuse of closed bases. These priorities are likely to be made up of some mixture of factors considered now, such as economic redevelopment, job creation, environmental health and safety, the provision of low-income housing, and green space. Their explicit presence in DLTC's charter, though, would ensure that the priorities are inputs into the transfer process from the beginning, rather than the output of a complex and often unpredictable set of negotiations and interest group interactions. Thus, all parties—the armed services as well as public and private stakeholders in the future use of lands on closed bases—could potentially gain from the creation of a DLTC-like structure.

The presence of UXO makes the process of preparing land on closed military bases for transfer outside of DoD lengthy and expensive. The expense is so great that it can be a significant part of the estimated short-run savings the services expect from base closure.⁹ As a result, the Army should consider doing whatever it can to make that process as efficient and value-creating to potential customers of BRAC land as possible. Working with Congress to create a federal government corporation that can be innovative, efficient, and respon-

⁹ Estimated UXO cleanup costs have run into the billions of dollars, DoD-wide. Of course, cleanup is a one-time cost, whereas the services expect to reap continuing savings by closing excess infrastructure.

sive to market incentives and opportunities is an avenue the Army should investigate fully.

APPENDIX C

Installation Survey

This appendix shows the telephone survey that RAND administered to Army BRAC environmental coordinators, EPA remedial project managers, and citizen chairs of Restoration Advisory Boards at ten Army BRAC installations with UXO. Chapter Three of the main text describes the survey's outcome.

Army BRAC Installation Survey:

Factors Complicating the Transfer of Land Containing Unexploded Ordnance

Introduction

Good morning/afternoon. My name is (interviewer name) and I am calling from RAND in Santa Monica, California. [IF NAMED RESPONDENT DOES NOT ANSWER PHONE] Could I please speak to [NAMED RESPONDENT]?

Consent

I am calling to follow up on a letter we mailed to you a few days ago. The letter mentioned that we would be calling you to request your help on a survey on the disposition of Army land in BRAC installations. We are evaluating options for managing land at closed bases that is contaminated with unexploded ordnance. We selected you because of your position as the <<Army point of contact>> / <<EPA point of contact>> / <<Community contact>> for <<Installation>>.

We are asking those who have been closely involved with the cleanup of such land for their opinions on which factors have been the most significant positive and negative contributors to the pace of cleanup of sites contaminated with UXO. The study is being sponsored by the U.S. Army, and is being conducted at the request of Major General Lust, Army Assistant Chief of Staff for Installation Management. RAND, a nonprofit research organization headquartered in Santa Monica, California, is conducting the survey.

Before we begin, I need to let you know that RAND will use the information you give me for research purposes only, and will not disclose your identity or information that identifies you to anyone outside of the research project, except as required by law. Taking part is entirely voluntary, so if you refuse it will not affect in any way your relationship to the DoD or the U.S. Army.

Do you agree to participate in this research interview? May I begin now?

Yes

No (Refuses to take part)

Call back

Section 1 (ASK OF ALL RESPONDENTS)

To what extent has each of the following factors facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>> that is known or suspected to contain UXO?

1. *The availability of funding for UXO clearance.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

2. *The existence or lack of clear and concise information concerning the amount, locations, and types of UXO present.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

3. *The existence or lack of clear standards for UXO response.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

4. *Existence or lack of standard DoD operating procedures for UXO response.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

5. *Land receiver's perceptions of liability that may occur.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

6. *Public perception of risk from UXO.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

7. *Environmental regulators' positions about risk from UXO.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

8. *State of knowledge of location of UXO.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

9. *State of knowledge of effectiveness of UXO detection instruments.* Would you say that has facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

| | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

10. Are there any other factors that have affected the transfer of land at your installation?

- Yes
- No
- Don't know

10A. What factors? _____

10B. Would you say they have facilitated, had no effect, slowed, or prevented the transfer of land at <<Installation>>?

- | | |
|---------------|---|
| Facilitated | 1 |
| Had no effect | 2 |
| Slowed | 3 |
| Prevented | 4 |

Section 2 (ASK ONLY OF ARMY POINTS OF CONTACT)

If possible, please provide the following information about the funding for cleanup of UXO at your Army BRAC installation:

11. What is the total estimated amount required to clear UXO areas at your installation?

\$_____ (Enter specific dollar amount)

d Don't know

n Information is not available

12. What is the source of this estimate?

_____ (Source)

d Don't know

n Information is not available

13. What is the date of this estimate?

_____ (Date)

d Don't know

n Information is not available

14. What is the expected duration of UXO cleanup assumed in this cost estimate?

_____ Months/Years

d Don't know

n Information is not available

15. What are the depths of clearance assumed in this cost estimate (as a percentage of the total acreage requiring clearance: e.g., "80% surface clearance, 20% excavation to 2 ft")?

d Don't know

n Information is not available

16. What is the 2003 budget allocation for UXO clearance at your installation?

\$_____ (Enter specific dollar amount)

d Don't know

n Information is not available

17. What is the average annual budget over the period 2000–2003 for UXO clearance at your installation?

\$_____ (Enter specific dollar amount)

d Don't know

n Information is not available

Section 3 (ASK ONLY OF ARMY POINTS OF CONTACT)

18. The letter that we sent you included a table containing data that we have collected concerning UXO-affected and non-UXO-affected acreage at your installation. Did you manage to send that back to us yet? If not, you could give me any corrections now over the phone.

1. Letter sent (when?)
2. Corrections made over the phone
3. Table was correct for installation, no corrections

Thank you very much for your time. If you have any questions, you can call the Army's BRAC representative, Ricky Stauber, at (703) 697-0130, or the RAND Survey Coordinator, Jo Levy, at (310) 393-0411, extension 6441.

APPENDIX D

Fort Devens, Massachusetts: Low UXO Density, Single Redevelopment Agency, and Financial Incentives Facilitate Transfer

The Fort Devens case illustrates that UXO land transfer is possible under certain, limited circumstances. At Fort Devens, a combination of a relatively small number of UXO items per acre, a limited number of parties involved in the transfer negotiations, and strong financial incentives provided by the state of Massachusetts made it possible for the Army to transfer 92 percent of the UXO-affected acreage.

Base History

Fort Devens is a 9,300-acre former U.S. Army base located 35 miles west of Boston within the towns of Shirley, Ayer, Lancaster, and Harvard. In 1917, Fort Devens was established as a temporary training camp for soldiers during World War I. The camp was made a permanent installation in 1931 and finally closed in 1996. During its tenure as a base, Fort Devens was used as a training site for infantry. It also housed various schools such as the Chemical Defense School. The rocketry pioneer Robert Goddard used the post for rocket tests.

Fort Devens is divided into three main areas: the North Post, the Main Post, and the South Post. Both rural and residential communities surround the installation, with 3,500 households within two

Interviews and research for this case study were conducted by Noreen Clancy.

miles of the base. Tributaries run directly through the base, and the Oxbow National Wildlife Refuge lies just south of the Main Post.

BRAC History

Fort Devens was included in the second BRAC round (1991) with the recommendation that the North and Main posts be closed and the South Post be realigned for use by the Army Reserves and National Guard. In 1996, Fort Devens closed as an active duty base, but 5,200 acres located primarily in the South Post became home to the Fort Devens Reserve Forces Training Area.

As a military installation, Fort Devens had an extensive infrastructure in place. When the base was being closed, studies indicated that 5.6 million square feet of land and 2 million square feet of existing buildings and facilities had potential for reuse because of their proximity to major highways and railroads. Several federal agencies expressed an interest in portions of the Fort Devens land for use as a Job Corps Center, a prison hospital, and a national wildlife refuge. The state was also interested in using the land to stimulate economic activity, primarily to replace the local jobs lost from the base closure. However, contaminated portions of the land had to be cleaned up before transfer or redevelopment of the base could occur. Although the EPA listed Fort Devens on the National Priorities List (the list of the nation's most contaminated sites) in 1989, the closure of the base accelerated the necessity for investigations and cleanup of the land.

Cleanup of UXO Sites

The U.S. Army Corps of Engineers prepared an archives search report (a historical review of records to identify possible UXO locations) in 1995. The report determined that during its years as an active installation, training with all types of ordnance and chemical warfare materiel occurred on the land. The Corps ranked Fort Devens as having high risk due to UXO. Based on the archives search report findings,

the Army oversaw two separate ordnance and explosives removal actions. Both were conducted by a private contractor and were carried out using the "time-critical removal action" process, which minimizes regulatory oversight in situations where hazards are deemed to be imminent and thus there is no time to conduct reviews.

First UXO Removal Action

The contractor carried out the first UXO removal action in 1995 on a parcel of land that was slated for transfer to the Bureau of Prisons. A total of 280 acres were identified for UXO clearance. Of this total, 70 acres identified as a future construction site were designated for surface and subsurface clearance to four feet. The remaining 210 acres were designated for surface clearance only.

To organize the clearance, the contractor divided the land into grids of 100□100 square feet, as is typical. Searching with Schonstedt magnetometers, the teams discovered 211 inert and 36 live UXO items in the 70 acres slated for subsurface clearance. The live UXO items were destroyed in place. During the surface clearance, 250 rounds of blank small-arms ammunition and one tail boom from a smoke rifle grenade were found. Two of the contractor's UXO removal personnel remained at Fort Devens to provide support during excavations of the Bureau of Prisons land.

Quality-control checks and inspections were performed throughout the project. A quality-control officer performed 10 percent magnetometer sweeps of each grid of the subsurface removal area and a 10 percent visual inspection of the surface removal area grids. An Army Corps of Engineers site-safety specialist conducted independent quality-assurance inspections. Magnetometers were field checked each day, and the quality-control officer conducted random field checks to ensure use of proper procedures and techniques. Also, the officer held safety briefings each morning that covered the types of UXO that might be encountered and other site and weather conditions that could affect safety.

Second UXO Removal Action

The second UXO removal action occurred in 1996 and involved clearing three sites. Those three sites were identified during a sampling effort of 30 sites as the only ones contaminated with UXO. The first site, 368 acres in size, consisted of swamp land between a river and a sewage treatment plant. Crews found eight live UXO items on this site. The second site, 38 acres in size, contained forested hills and valleys as well as private homes and a playground. Crews found 47 UXO items there. The third site, 7 acres in size, contained recreational areas, including a playground. Crews unearthed 14 UXO items at this last site. At the latter two sites, crews could not search paved surfaces such as roads, sidewalks, driveways, and basketball courts.

At these locations, the quality-control officer checked the use and performance of all equipment, monitored UXO search procedures, and surveyed each grid with a magnetometer. In addition, crews field checked magnetometers each day against a 3-inch Stokes mortar buried to a depth of four feet. A safety officer routinely inspected emergency and safety equipment and held a daily safety briefing. The safety officer also verified the condition of all UXO and the UXO scrap recovered.

Transfer and Redevelopment of the Land

When Fort Devens was listed on the National Priorities List, 324 sites were identified as requiring remediation. As indicated above, all the UXO sites have been remediated. Most of the other contaminated areas are either cleaned up or are being cleaned up, with all the involved parties having agreed on a remedy for the contamination. All remediation is scheduled to be completed by 2005.

Of the remaining 4,100 acres of Fort Devens land, some went to other federal agencies, but the largest portion was transferred to a development agency appointed by the state legislature. DoD transferred 22 acres to the Department of Labor for a Jobs Corps Center, 222 acres to the Department of Justice (Bureau of Prisons) for a prison hospital, and 368 acres to the Fish and Wildlife Service as an exten-

sion to the Oxbow National Wildlife Refuge. The remaining acres went to MassDevelopment, a quasi-public real estate and economic development agency tasked with stimulating private redevelopment of the land.

MassDevelopment and representatives from the surrounding towns prepared a reuse plan to delineate the future private use of the land. The plan was drafted in 1992 and approved by the communities in 1994 and includes plans for both residential and business communities as well as preserving 2,100 acres as open space. Thus, the plan was completed before the archives search report identifying potential UXO locations was conducted.

Early on, the community believed that the transition from military base to a business and residential community might take 40 years. Today, less than eight years after base closure, more than 50 percent of the allowable build-out has already occurred. This includes projects such as a new 410,000-square-foot warehouse and distribution center for the Gillette Corporation and the establishment of a new school district.

Conclusions and Observations

The cleanup and transfer of UXO-containing land at Fort Devens proceeded largely without delays. This was most likely due to three factors. First, the UXO density was relatively low. A total of 105 UXO items were found on 693 acres designated for clearance, equating to a UXO density of 0.15 per acre. Second, the Army conveyed approximately 75 percent of the land to a single organization (MassDevelopment) that was given authority by the state to oversee the entire redevelopment process. The remaining land, divided among three federal agencies, was reused for activities for which UXO would pose a relatively low risk (a prison, a wildlife refuge, and a Job Corps center). Third, the state created strong financial incentives to redevelop the land, including eliminating personal property taxes and providing utility service at wholesale rates.

APPENDIX E

Fort McClellan, Alabama: Shifting Land-Use Decisions and Decisionmaker Involvement Delay Transfer

Transfers of UXO land at Fort McClellan have been delayed by an inability of the numerous organizations involved to reach consensus on land uses and cleanup protocols. This problem has been exacerbated by the rotation of new individuals into the decision process and the associated delays as people familiarize themselves with problems and question previous decisions. This has been a particularly acute problem for the Restoration Advisory Board (RAB) and environmental regulatory agencies.

Base and BRAC History

Fort McClellan was established in 1917 and initially used as a training post for World War I troops. For the next 82 years, Fort McClellan served as a training site for World War II soldiers, an internment camp for war prisoners, the U.S. Army Chemical Center and School, U.S. Women's Army Corps Center, U.S. Army Combat Developments Command Chemical Biological-Radiological Agency, Advanced Individual Training Infantry Brigade, U.S. Army Military Police School, the Training Brigade, and the Department of Defense Polygraph Institute. The 1995 BRAC Commission recommended the base for closure.

Interviews and research for this case study were conducted by Henry Willis.

Fort McClellan comprised three parcels of land:

- the Main Post, consisting of 18,929 acres adjoining Anniston, Alabama;
- the Choccolocco Corridor, 4,488 acres leased from the state of Alabama Forestry Service; and
- Pelham Range, containing 22,245 acres used for maneuvers, firing ranges, and field training.

The base closure process called for the lease on the Choccolocco Corridor not to be renewed, and the land reverted to the state of Alabama. Pelham Range was to be transferred to the Alabama Army National Guard (ALARNG) and retained as a training range. Most of the Main Post acreage (18,619 acres) was to be transferred to other users, with the remainder being transferred to the ALARNG and the U.S. Army Military Police.

Initial estimates, based on historical records, indicated that 13,286 of the 18,619 acres on the Main Post contained UXO. Preliminary assessments indicate that 5,818 acres of land will require remedial actions for UXO based on planned land use and initial surveys.

Land Reuse

Land from Fort McClellan is scheduled to be transferred to several different authorities for a variety of land uses. New owners of the land will include the Joint Powers Authority (JPA), the Alabama Department of Transportation, the city of Anniston, the Alabama Fish and Wildlife Department, and the Alabama Department of Forestry.

The JPA is responsible for planning land uses for transferred lands and arranging development of these lands to maximize the land value. Land uses range from parklands for hiking or sports recreation, to residential development, to light industry. The Alabama Department of Transportation received a section called the Eastern Bypass for purposes of building a highway. The city of Anniston has received

non-UXO land containing buildings, utilities, and a golf course as transfers for public benefit. The Fish and Wildlife Department will use the transferred lands for conservation, education, and hunting. Finally, the previously leased land reverting to the state Forestry Department is being considered for mixed use, as conservation planning is competing with residential and school uses.

To this date, only 20 acres of land containing UXO have been transferred from Fort McClellan. This land was scanned using metal detectors and assessed as being cleared to one foot because nothing was found during these scans. As such, this land was transferred in February 2001 to the JPA with no land-use controls attached.

Land-Reuse Planning Process

The JPA manages land-use planning for transferred lands from Fort McClellan. Other stakeholders in the process are the environmental regulatory authority and the RAB. The land-use planning process has been impeded by changes in representation for the environmental regulatory authority and the RAB and a sense of minority disenfranchisement through the RAB and JPA processes.

During initial planning, the EPA Region IV held regulatory authority over Fort McClellan transfers. Ultimately, regulatory authority was yielded to the Alabama Department of Environmental Management (ADEM). Though the transfer of regulatory authority was rapid, it took approximately two years for ADEM to secure contractors to support the required review processes. In addition, ADEM staff did not have prior experience with UXO issues. While ADEM was securing the necessary support and learning more about the UXO problem, land-use planning progressed at Fort McClellan. As a result, ADEM wanted to revisit decisions that others felt were previously agreed upon.

The RAB was assembled as part of the BRAC process to allow citizens to review and comment on remedial decisions. The Fort McClellan RAB has approximately 15 active members, and this level of participation is perceived to be both sufficient and appropriate.

However, the success of the board in the decision process has been limited by both the board's expertise and its lack of diversity.

The RAB is composed of citizens, many of whom lack specific expertise related to the remedial decisions at Fort McClellan. Though the RAB is given a lot of information, there is a sense within the board members that they are unable to interpret the information correctly and know whether they are asking the correct questions. While the RAB chairperson reports a moderate level of satisfaction with the RAB decisions to date, she is less satisfied with the decision process. There is pressure for the RAB to make decisions, despite not being provided with the information and expertise required to make fully informed choices.

The lack of diversity on the RAB has contributed to perceptions of further inadequacy of the decision process. According to the RAB chair, the majority of the RAB was initially white males who retired from military service. Though the diversity of the board has improved, there has been a sense in the community that underrepresentation on the RAB and in the larger decisionmaking process has led to minority disenfranchisement and exclusion from receipt of benefits from the transfer process.

Like ADEM, the RAB also suffers from a problem of participant turnover. The transfer process is long, and participation on the RAB takes time. As participants drop off the board, they are replaced. New members often question previously made decisions, and there is a feeling that some new members seek RAB membership with their own agenda in mind.

Effect of UXO on Land-Reuse Planning

The Army environmental impact statements and initial land-use planning reflected archival knowledge of UXO and considered these lands only for highly controlled and light land uses. These recommendations were incorporated into initial land-use plans. As the planning process has progressed, the JPA has revised land-use plans, suggesting more intensive uses (including light industry and recrea-

tion) on lands that could potentially have UXO. These land-use revisions require regulatory decisions to be revisited by ADEM and the RAB and have direct implications on the remedial costs associated with the transfer.

While the JPA's initial plans were perceived to be appropriately constrained by UXO, later revisions have been perceived as being directed by the value of the land, assuming the Army remediates it to the desired land use. Though the transfer process has been ongoing for several years, continued changes in the land-use process create a contentious political environment and delay the transfer process.

The U.S. Army Corps of Engineers used the Ordnance and Explosives Risk Impact Assessment (OERIA) process to determine the adequacy of different cleanup approaches in reducing risks. ADEM, citing a RAND briefing, expressed concern that this method was too qualitative and nontransparent. The risk analysis process and communications have been revised, largely in attempts to increase the transparency of the method. However, discussions with the RAB chairperson suggest that the explanations of the methods were still unclear.

UXO Clearance

UXO surveys and clearance rely on both magnetic scanning and geophysical mapping. Two standards are used across the site: clearance to one foot and clearance to depth (i.e., to the depth of deepest identified UXO). In some areas, surveys with metal detectors found nothing, though the metal detectors are reportedly only validated to the depth of one foot. The Army contends that for such areas, this can be considered equivalent to clearance to depth if historical records suggest there should not be UXO deeper than one foot.

For areas searched with hand-held magnetometers and cleared immediately upon finding UXO, quality control is conducted both by contractors and by a government oversight engineer, either from Army Corps of Engineers or a contractor. In these areas, quality con-

trol is typically a 10 percent back check of the cleared area. If any new ordnance is found, the entire area is recleared.

For areas where UXO locations are mapped using a geophysical device before clearance, quality control involves independent processing of the geophysical data by the contractor and government and a 10 percent rescan after the initial clearance. The failure criterion for the back check is identification of any item with the profile equal to or greater than the target munition, even if the profile is created only by scrap metal.

The validity of the screening methods used and quality-control process employed was a point of contention with ADEM. This issue has been largely addressed, and quality-control procedures have been modified because of negotiations throughout the decision process.

Conclusions and Observations

The experience of transferring UXO lands at Fort McClellan illustrates how delays can arise due to the lack of agreed-upon protocols for UXO clearance and subsequent land uses. At Fort McClellan, the disagreements over the cleanup approach were exacerbated by the lack of sufficiently broad community involvement, which led to distrust and delays from additional challenges of land-use decisions and calls to revisit previous decisions. Organizational and personnel turnover also contributed to the delays, but these delays might have been reduced had cleanup standards been firmly established.

Fort Meade, Maryland: Congressional Mandates Lead to Rapid Intragovernmental Transfer

Fort Meade provides an example of Congress intervening in a dispute about future land use and UXO cleanup and resolving the matter through legislative mandate.

Base History

Fort George G. Meade was established as an Army post in 1917. Until the base was closed due to its selection as part of the Base Realignment and Closure Act of 1988, it served as a site for landfills, a range and maneuver area for training exercises, and Tipton Airfield. In addition, the base provided facilities for tenants that included the National Security Agency and the Secret Service Training Facilities. Base lands had also been historically used for hunting.

Fort Meade occupied 13,309 acres of land in northwestern Anne Arundel County, Maryland. The BRAC Act of 1988 designated an estimated 8,470 acres of land for disposal, with the remaining acreage being realigned for use by the Army.

Interviews and research for this case study were conducted by Henry Willis.

Land Reuse

All 8,470 acres of land at Fort Meade have been transferred. The Defense Appropriation Bills for FY1991 and FY1992 called for 7,600 acres and 500 acres of land, respectively, to be transferred to the Department of the Interior. These transfers occurred in 1991 and 1993, respectively. In 2001, Tipton Airfield was transferred to Anne Arundel County for use as a county airport.

Land-reuse planning and establishment of UXO clearance goals were contentious at Fort Meade until Congress stepped in. Initial planning by the Army did not account for UXO. Rather, the development value of this land was considered a potentially large benefit to the Army. The Army prepared its initial best-use plan without consulting the community. The initial proposed land uses ranged from residential development to a Disney-like theme park. The resulting outcry from citizens who felt they had not been adequately consulted and who objected to the plans led to intervention from Congress.

The congressional appropriations bills noted above specified the ultimate reuses of the base. All land transferred to the Department of the Interior has become part of the Patuxent Research Refuge. Land uses on this acreage include hunting, hiking/recreation, and conservation through a restricted nature preserve.

Though the transfer of this land occurred quickly, the community is not fully satisfied that the public is protected from UXO hazards. In particular, UXO remains on lands that are designated as a restricted nature preserve. Though citizens are supposed to be protected from this UXO hazard by the fences and signs intended to prevent access, people still enter the property and are exposed to potential harm from UXO.

UXO Clearance

The only land cleared prior to transfer was Tipton Airfield. The U.S. Army Corps of Engineers' contractors cleared this land to four feet using magnetometers. The refuge land was transferred to the De-

partment of the Interior before being cleared. Clearance was dictated to be survey and surface sweep with clearance to one foot. However, this was later deemed too intrusive for many of the areas designated for conservation, and clearance to six inches was the standard eventually used. The quality-control process, managed by the Corps of Engineers, involved resurveying 10 percent of the land after it was cleared.

The decision to reduce the clearance depth was contentious. The Army Environmental Center used risk assessment modeling to estimate that the reduction of risk from clearance from six to twelve inches was not cost-effective. All of this clearance has been completed, except in areas inundated with water (e.g., the Patuxent Creek) and selected other areas because clearance was determined to be too intrusive for the ecosystem that was to be conserved.

Conclusions and Observations

Though Fort Meade shows that rapid land transfer is possible when Congress intervenes and dictates the land use, it also provides lessons about the difficulties in protecting the public from explosive hazards from UXO. On the Department of the Interior lands used as a restricted nature preserve, humans are protected by being excluded from the area. But experience at Fort Meade has shown that it is difficult, if not impossible, to keep people off this land. As a result, some people in the community feel that it is not practical to transfer UXO lands given the costs of remedial actions, strict land-use controls required, and residual difficulties in protecting the public from the explosive hazards despite remedial and land-use control measures.

APPENDIX G

Fort Ord, California: Surprise UXO Discoveries and Lack of Standards Delay Transfer

The Fort Ord case illustrates how the lack of an adequate UXO map and agreed-upon standards for UXO removal can stymie land transfer and reuse. At Fort Ord, essentially no acreage known to contain UXO has been transferred to civilians. Some 12,000 acres containing UXO await final disposition.

Base and BRAC History

Fort Ord served as an Army infantry post from its establishment in 1917 until its closure in 1994. It housed a succession of infantry divisions and was a staging ground for troop deployments during World War II. From 1947 until 1975, it served as a basic training center.

The BRAC Commission identified Fort Ord for closure primarily because of its relatively small size. With weapons of longer ranges, the Army needed larger parcels of land for training, and the training needs of Fort Ord eventually outstripped the size of the installation. Troops had to travel an hour and a half to Fort Hunter Liggett for much of their maneuver activity. The installation also contained a large number of substandard, World War II-era wooden structures that had lasted longer at Fort Ord than elsewhere and would need to be replaced to meet current building codes.

Interviews and research for this case study were conducted by Jacqueline MacDonald.

Fort Ord occupies approximately 28,000 acres of the California coast, about 80 miles south of San Francisco, in Monterey County. The installation occupies prime real estate, much of it with ocean views. In the surrounding county, the median home price during the first quarter of 2003 was \$405,000, according to the California Association of Realtors. Fort Ord also contains a large amount of undeveloped acreage that supports several nearly extinct species, as well as a beach dune area that is one of the best preserved in the state.

Unexploded ordnance is present on approximately 12,000 acres of the installation. Much of this ordnance is concentrated in the 7,000-acre multirange area, which was used for live-fire weapons training. Types of munitions used ranged from small arms to grenades, rockets, artillery projectiles, bombs, landmines, and demolition materials. When the base was closed, the Army informed the local community that UXO presence was limited to the multirange area and the beach dune area, which had been used primarily for small-arms training. Later, UXO was discovered at a number of other locations, including on acreage that had already transferred to the Bureau of Land Management and on land slated for reuse as a housing development.

Land Reuse

Approximately 11,600 acres of Fort Ord's 28,000 acres had been transferred to civilian uses as of April 30, 2003. The rest of the acreage is idled while environmental remediation and the process of getting reuse permits continue. The former multirange area is encircled with razor wire, and access is prohibited to all but those on official duty. Former military housing and a large number of other structures remain vacant.

The transferred land is being used for a variety of purposes, ranging from habitat preservation to education, housing, and commerce. One of the first recipients of transferred land was the California State University system, which established a new campus on a

portion of Fort Ord. The Bureau of Land Management also received large parcels. Other recipients include

- City of Seaside (which received golf courses as well as other property),
- City of Marina (which received a former air field),
- County of Monterey,
- several educational institutions (including California State University Monterey Bay, Monterey College of Law, Monterey Peninsula Unified School District, and Golden Gate University),
- academic research institutions (the Monterey Institute for Research in Astronomy and the University of California Monterey Bay Education, Science, and Technology Center),
- Children's Services, Inc. (a child-care center),
- Housing Authority of Monterey County (for public housing),
- Shelter Outreach Plus (for a homeless shelter),
- Goodwill Industries,
- American Youth Hostels,
- Monterey-Salinas Transit Authority,
- Empire West Corp., and
- Department of Veterans Affairs.

A formal plan developed by the local communities guides the reuse. According to this plan, the approximate mix of uses once the entire installation is transferred will be as follows:

- 16,000 of 28,000 acres for habitat conservation;
- 4,000 acres for open space and recreation; and
- 8,000 acres for commercial, residential, and educational uses.

Land-Reuse Planning Process

Initially, at the request of Representative Leon Panetta, the communities surrounding Fort Ord formed an organization—the Fort Ord Reuse Group (FORG)—to manage reuse planning for the installation. A FORG working group composed of planners from each of the

six local government districts as well as from the University of California and California State University systems developed an initial reuse plan. All of the jurisdictions approved this initial plan in April 1993.

As the 1994 base closure date approached, the California State Assembly passed a law formally establishing the Fort Ord Reuse Authority (FORA) on May 20, 1994, as a corporation of the state. FORA was charged with preparing, adopting, financing, and implementing a reuse plan. FORA's 13-member board consists of three members of the Monterey County Board of Supervisors; two city council members each from Marina and Seaside; and one city council member each from Carmel, Del Rey Oaks, Sand City, Monterey, Pacific Grove, and Salinas. Representatives of the University of California, the California State University system, Monterey Peninsula College, the local school district, the Army, the local transportation and water resource authorities, and the local congressional offices serve as ex officio members. FORA's initial reuse plan served as the starting point for the formal "Final Reuse Plan," which FORA completed in 1997.

Public involvement in the planning process outside the formally appointed members of FORA has been limited to circulation of newsletters and the scheduling of public information presentations and hearings.

Effect of UXO on Land-Reuse Planning

When FORA was drawing up its reuse plan, the Army provided information indicating that UXO was confined to a few clearly delineated areas, according to FORA's executive director. The reuse plan was predicated on these early indications of UXO location, as specified in the Army's formal Record of Decision for disposal of the property. The reuse plan called for UXO areas to be set aside as wildlife preserves.

After the reuse plan was completed, UXO was discovered to be much more widespread across the installation than the Army had indicated, including in some areas that the reuse plan had designated for housing and, as previously noted, on property already transferred

to the Bureau of Land Management. Negotiations to modify the re-use plan accordingly are occurring parcel by parcel. In one instance, FORA agreed to move a housing development scheduled to be constructed at a location (known as Parker Flats) where UXO was discovered to another parcel (East Garrison), two miles away. From FORA's perspective, this swap was not ideal, because the Parker Flats development was designed to adjoin commercial areas that would serve the community.

The discovery of additional UXO areas has delayed transfers by many years. For example, the Parker Flats development was to have been completed by 1999, but because of the need to move it in response to UXO, it is still not complete.

UXO Clearance

Requirements for UXO clearance at Fort Ord are negotiated among state regulators, the EPA, FORA, and the Army separately for each parcel of land. There are no agreed-upon standards for search depth or amount of excavation required.

One UXO area (Del Rey Oaks) has been cleared as a test case and is nearly ready for transfer for development as a resort hotel and golf course. At this location, the Army surveyed all 350 acres two times with two different metal detection technologies (a Schonstedt 52/CX magnetometer and an EM61 electromagnetic induction device). Every anomaly found was excavated, regardless of depth. The Army presupposed, based on prior statistical sampling, that large tracts would not contain UXO and had planned to survey and clear only selected areas, but regulators insisted on a 100 percent survey. This survey revealed UXO in areas previously thought to be clean.

At the cleared Del Rey Oaks parcel, special covenants, permitting requirements, and land-use restrictions will be put in place. Future development of housing, child-care facilities, schools for minors, and hospitals will be prohibited. Permits will be required before digging more than 10 cubic feet of soil. Land owners will be notified annually via mail of the possible presence of UXO on their property

and the associated permits required for digging. The Army will be required to conduct a review of possible UXO presence every five years. All construction workers will undergo UXO training. An onsite UXO expert will be present during construction.

Although there are as yet no installation-wide standards for UXO clearance depth or search and excavation procedures, the involved agencies have agreed on a quality-control procedure (Parsons, 2001). The procedure calls for a quality-control specialist to identify a subset of grids to be resurveyed with the same detector used for the initial clearance. The first three grids are checked again over 100 percent of their area. If the first three grids pass the test, then 30 percent of the next five grids is scanned for metal. If these five grids pass, then 20 percent of the area in each of the next five grids is scanned. If all the previous grids pass, then 10 percent blocks of the remainder of the grids are surveyed. The procedure defines failure to pass a grid check as "discovery of a UXO or UXO-like item or five nonselected anomalies as a result of the QC [quality-control] survey." It specifies, "If a failure occurs, it will be discussed . . . and a resolution determined."

Conclusions and Observations

Fort Ord's Army BRAC environmental coordinator said that the main lesson from Fort Ord is that the Army should never again try to transfer UXO-containing land for general civilian uses. The Army should retain this land, or it should be used only for weapons training for law enforcement officials.

The EPA remedial project manager for Fort Ord said that the Fort Ord experience demonstrates that UXO should be a key consideration in future plans to close additional bases. At Fort Ord, UXO clearance has proved to be much more costly than anticipated, and even a large budget cannot guarantee UXO removal sufficient for unrestricted land use. Spending on UXO remediation at Fort Ord is running at more than \$10 million per year, according to budget

documents from the Army BRAC Office, and the cleanup still has not met the expectations of the involved government agencies.

FORA's executive director observed that based on the Fort Ord experience, it is clear that a thorough UXO survey should be completed before land-reuse planning begins. At Fort Ord, this survey was not completed until three years after the base closed, by which point the land-reuse plan already had been written. The survey should include interviews with soldiers previously stationed at the installation and complete searches of historical records. The local community should also be involved in planning the environmental survey and closure process.

The FORA executive director also pointed out that the large number of government agencies involved in the approval of cleanup and transfer has led to delays. Thirty-six government agencies—federal, state, and local—are involved at Fort Ord. Each of these agencies has separate processes that need to be negotiated before the property can be transferred. He suggested that this problem might be solved by creating a new, federal agency charged with the disposal of surplus military property.

Fort Ritchie, Maryland: Strong Partnership with Community Facilitates Land Lease, But Transfer Is Slow

Despite the in-process discovery of additional UXO-contaminated lands, the Fort Ritchie BRAC process seems to have proceeded unusually smoothly. There is general agreement that the Army has addressed the public interest in forthcoming and responsible ways, with clear communication and effective partnerships. The transfer process is currently being held up by litigation unrelated to UXO or environmental contamination.

Base History

Fort Ritchie is situated on the northern edge of Maryland, in Washington County. Near the hamlet of Cascade, it lies between Frederick, Maryland, and Gettysburg, Pennsylvania, surrounded by rural and hilly, forested lands. Before military use began in the area, it was used during the warmer months as a high-end resort, attracting the wealthy from Philadelphia, Baltimore, and Washington, D.C. During the winter, ice was harvested from the artificial lakes used by summer visitors to supply Washington, Baltimore, and other cities further south.¹

Interviews and research for this case study were conducted by Jimmie McEver.

¹ Kathy Fotheringham, "Fort Historical Collection . . . Fort Ritchie Collector's Page," http://www.demilitary.com/army/standard/archives/mov14/fd_cola111397.html.

In 1926, the state of Maryland purchased 580 acres in the area for use as a training site for the Maryland National Guard and named it Camp Albert C. Ritchie in honor of the governor. The first troops to train at Camp Ritchie arrived on July 9, 1927. During World War II, the U.S. Army leased Camp Ritchie to provide a centralized Military Intelligence Training Center (MITC), constructing a mock German village on a portion of the camp to train counterintelligence personnel to operate behind enemy lines. After World War II, Camp Ritchie reverted to the state of Maryland, which used it for Maryland's chronic disease hospital.

The Army again acquired control of Camp Ritchie in 1948 to support the planned Alternative Joint Communications Center (AJCC), which began operation in 1954. AJCC support was Fort Ritchie's² primary mission until closure. From the 1970s, Fort Ritchie was one of the lead information service providers for the Army within the continental United States.

Fort Ritchie comprises approximately 615 acres, roughly half of which are used for administrative buildings, support facilities, and residential housing. No weapons training has taken place at the facility since the early 1950s, but before then some base acreage was used as training ranges for rifles, machine guns, mortars, and howitzers, resulting in potential UXO contamination in 321 acres of the former base. During the investigation and survey of this acreage, another 43 acres were identified as containing UXO, bringing the total to 364 acres.

Fort Ritchie was selected for closure in the 1995 BRAC round, officially closing its doors on September 30, 1998.

² Camp Ritchie was renamed Fort Ritchie in 1951.

Land Transfer and Use

In preparation for the Fort Ritchie closing, Washington County officials formed the PenMar Development Corporation, a quasi-governmental agency established to acquire and redevelop Fort Ritchie land for civilian uses. PenMar has contracted with DoD for the right to lease approximately 592 acres of the former base, once the Finding of Suitability to Lease (FOSL) is completed, with the intention of acquiring the land once the Finding of Suitability to Transfer (FOST) is executed. The FOSL and FOST processes include the identification, survey, and clearance (if necessary) of lands containing or suspected of containing UXO.³ To date, none of the Fort Ritchie land has been transferred, but PenMar currently leases roughly 30 acres in the potentially contaminated areas, and about 55 acres in the non-UXO area. PenMar is planning to redevelop the Fort Ritchie site as a corporate conference and training center, with residential development as well.

In addition to PenMar's stake, DoD will retain approximately 23 acres for use by the Maryland National Guard.

Presence of UXO⁴

From the usage history of Fort Ritchie and the archives search report conducted as part of the closure and transfer process, five closed, transferring, and transferred (CTT) ranges were identified as potentially containing UXO, with a total area of 321 acres.⁵ These ranges include the following:

³ The FOSL and FOST processes also include appropriate identification and remediation of other environmental contaminants, but this study focuses on UXO-relevant issues.

⁴ Information for this section was drawn heavily from URS Group, Inc., "U.S. Army CTT Range and Site Inventory, Fort Ritchie BRAC Property, Maryland," December 2002, and from a telephone interview with Mr. Bill Hofmann, the Army's point of contact for Fort Ritchie, May 15, 2003.

⁵ Seven ranges were actually identified in the December 2002 CTT Range and Site Inventory Report, but three small-arms ranges have since been consolidated into a single small-arms range.

Impact Area A. Consisting of 176 acres at the center of Fort Ritchie, Impact Area A was used for training from approximately 1926 to the mid-1950s. This was the primary range for impact area activities, as it includes the eastern slope of Quirack Mountain, which provided a useful backstop for firing of weapons, including rifles, machine guns, mortars, and howitzers. This cantonment area was surveyed and cleared to a depth of four feet (below the frost line), except for portions of the wooded mountainside, where a one-foot depth of clearance was deemed sufficient. Clearance was certified complete in April 2003. Impact Area A is partially undeveloped but has some current office, housing, and recreational use. Once the FOST is completed, Impact Area A will be transferred.

Impact Area B. The almost 9 acres of Impact Area B are just outside the western boundary of Fort Ritchie and are considered to be "transferred," since the Army never owned them. The area was identified in the CTT process due to the presence of some mortar, artillery, and small-arms fire that overshot Impact Area A. This area has been inspected and cleared to a depth of one foot as noted above. Currently owned by the state of Maryland and by a private-sector owner (both of whom will retain ownership), it is remote and undeveloped and, due to its location and terrain, considered unlikely to be developed in the near future.

Small-Arms Firing Area. This area comprises 82 acres and was used from 1926 until the mid-1950s as a small-arms training range for Maryland National Guard and MITC personnel. Pistols, rifles, and machine guns were fired in this area. During the UXO sampling investigation, ordnance and explosives (OE) scrap was found, but no UXO was discovered. As a result, no subsequent clearance activity by the Army was determined to be required. After FOST completion, this land will be transferred. Currently, portions of the land are undeveloped, while other parts contain residential and office buildings or are used for recreation.

Sector 5. This area of 22 acres served as a training site for MITC from 1942 until 1945. A mock German village was constructed in this area for training intelligence personnel to operate behind enemy lines. UXO sampling determined that no UXO was present, though

some OE scrap was found. As with the small-arms firing area, no subsequent clearance action by the Army was determined to be required. After FOST completion, the lands in Sector 5 will be transferred. Current uses include some industrial facilities, some recreational use, and some undeveloped land.

Parade Field. Located in the eastern portion of Fort Ritchie near the base's two lakes, the Parade Field comprises 32 acres. Formerly used for formation marching and other typical parade field activities, this area is designated as a CTT range because it had the potential for live fire (e.g., soldiers marched in formation with loaded weapons). There are no munitions issues related to this site, and no subsequent clearance activity is required. After FOST completion, it will be transferred. It is currently used for office buildings, but much of the field is undeveloped.

In-Process Discovery of UXO

As is typical, the Army Corps of Engineers began the clearance process in Impact Area A by excavating around the ASR-determined boundary of the range, attempting to establish a 200-foot-wide buffer zone between UXO-containing land and parcels designated UXO-free. In the fall of 2001, while working on the southeastern portion of the Impact Area A border, workers repeatedly found UXO in the buffer area, which continued to push the Impact Area's boundary closer and closer to residential areas. Unlike UXO discovered elsewhere on the firing ranges, however, the UXO discovered in this area was distributed differently than would typically be the case, given the range, topography, and depth of the finds. Further, these new UXO elements seemed to be too close to the original firing points and too far off the line of fire to be easily explained as remnants of past training exercises.

Subsequent research yielded insight into the probable course of events. During the early 1950s (and through the mid-1960s), residential housing was constructed at Fort Ritchie. Most of Ritchie's level ground was already built up, however, and fill dirt was needed to level the area designated for Ritchie's new housing. Aerial photographs taken about the time of the new construction showed scarred

areas of land in the Impact Areas, suggesting that the fill dirt for the new housing was taken from land now known to be contaminated with UXO.

The Army did not feel that this newly discovered UXO contamination posed any immediate threat, as no UXO had ever been discovered in this area, and Army personnel and their families had lived in the housing in question for 40 years without incident. However, the Army explained the situation to PenMar and the residents of the housing in question and took immediate steps to ensure that the surface was clear and that residents were aware of no-dig policies. In the fall of 2003, when additional housing units become available after clearance in other areas is completed, residents will be moved into the new housing so that this UXO fill area⁶ can be cleared.⁷ This new find added 43 acres to the UXO-potential land at Fort Ritchie, bringing the total to 364 acres.

When PenMar was informed of the UXO-containing fill on lands it was currently leasing and on which residents lived, it expressed concern for its tenants and was very interested in learning the Army's remediation plans. PenMar appears satisfied with the Army's clearance proposal, though the tenants are likely to be unhappy about being forced to move elsewhere on the base while the land is being cleared.

⁶ The Fort Ritchie CTT Range and Site report identifies three separate UXO fill areas, which have since been consolidated into a single UXO fill area.

⁷ This area will be cleared to a depth of four feet, consistent with the clearance standards for the other UXO-containing lands at Fort Ritchie. During the UXO fill area clearance, infrastructure and buildings will not be removed in order to clear the land beneath them; rather, covenants will be built into the FOSTs that notify future owners of the potential for UXO on the land and that require building permits and Army notification of subsequent construction so that appropriate inspection and clearance can be carried out.

Stakeholder Involvement

At the beginning of the Fort Ritchie BRAC process, a BRAC cleanup team (BCT) was assembled, consisting of a representative each from the Army, the U.S. Environmental Protection Agency, and the Maryland Department of the Environment. Shortly after Fort Ritchie's BRAC selection, the BCT began meeting to identify and address any environmental issues related to Fort Ritchie's closure and upcoming land transfer. An EPA official involved on the BCT cites these early meetings and the strong working relationships established as being critical to the relatively smooth transition that Fort Ritchie has enjoyed. Since no lands on Fort Ritchie were on the National Priorities List for cleanup, the closure and transfer process was an internal Army process, but the good relationships established early on allowed for active EPA and Maryland Department of the Environment participation, in which consensus could be developed. While not all Army actions had the concurrence of EPA/MDE officials, the EPA official interviewed noted that the points of disagreement were relatively minor and remained only after genuine discussion and exchange of ideas. There was a great deal of partnering with EPA in the Army's decision processes, and, in the view of the EPA official, the Army "did what they needed to do in order to protect the public, maybe even over and above."⁸

In addition to the BCT, invitations to individuals in the community were extended for participation in the RAB, a community-based body that serves as liaison with the Army and provides for an information exchange between the Army and the local citizenry on Fort Ritchie closure- and transfer-related issues. Due to the remote location of Fort Ritchie and its rural setting, there was not a great deal of community interest in participation on the RAB, which had only 10–15 community members. With the environmental/UXO

⁸ Insights from the perspective of the EPA were gleaned from a telephone interview with Ms. Mary Cooke, Federal Facility Remedial Project Manager, U.S. Environmental Protection Agency.

work almost complete, the RAB was retired in December 2002, after having agreed upon the Army's plans for cleanup completion.⁹ During operation, the RAB members were interested and active in their participation,¹⁰ and from the Army's point of view, the RAB was a positive influence on the Fort Ritchie process and on the community in general, where the primary communications medium is word of mouth.

Conclusions and Observations

Despite the in-process discovery of additional UXO-contaminated lands, the Fort Ritchie BRAC process seems to have proceeded relatively smoothly, with general agreement that the Army has addressed the public interest in forthcoming and responsible ways. That said, the transfer process, which was originally scheduled to have taken place three years after base closing, is in its fifth year at this writing (May 2003) and is slated for completion in 2005. Though cleanup has taken somewhat longer than expected, some of this delay is due not to environmental and UXO cleanup processes but to ongoing litigation among PenMar, Role Models Academy (a former tenant), and the Army.¹¹ The resulting court-ordered transfer injunction issued against the Army will be removed only upon the Army's re-advertising of this surplus property. The injunction aside, cleanup will not be complete until 2004, and, given the presence of UXO on roughly half of Fort Ritchie's acreage, this experience seems consistent

⁹ Though the RAB has disbanded, the Army will continue to propagate relevant information to the community through public meetings or information sheets.

¹⁰ According to the Army point of contact, some of the RAB members remembered when Fort Ritchie was used as an active range and thus had a historical interest in the disposition of the base, in addition to their environmental interest.

¹¹ The lawsuit pertains to the process by which the Army publicized the opportunity for public-benefit organizations to apply to be potential receivers of land on the former base.

with the long time lines for transfer seen at other bases where UXO is involved.

Costs have also been enormous. An EPA official interviewed estimates that the Army has spent close to \$30 million so far for the clearance of more than 200 acres. The Army's point of contact estimates cleanup costs to be \$25,000–\$50,000 per acre, extremely high considering the rural setting and potential value of the land involved. His view is that, given current technology and cleanup costs, the Army should close, rather than attempt to clean up and transfer, all known former ranges to all public access. This position should hold until new detection and cleanup technology render the cleanup process more cost-effective and safer for the workers. He suggests that DoD become an even larger wildlife/endangered species steward by allowing the Interior Department to manage these areas as refuges.

While costs in terms of time and money have been high, the Fort Ritchie process seems to have proceeded smoothly with regard to environmental/UXO cleanup issues. While some of this can be attributed to the absence of high-level environmental contaminants (except for UXO), high-quality participation by all parties involved seems to be the main contributing factor. Example communication strategies include the following:

PenMar. The presence and viability of a local reuse authority has likely simplified the Army's transfer process, because it can deal with a single entity for transfer-related issues.¹² Some concern in the local community (the hamlet of Cascade, which is adjacent to Fort Ritchie) has arisen because of a lack of representation in PenMar's leadership (the bulk of PenMar's board is from Frederick, the county seat of Washington County, which is some 20 miles from Fort Ritchie and in a much more developed part of the county). PenMar has recently taken steps to add board members from the Cascade area as current board members retire.

¹² However, due to the above-mentioned injunction, the Ritchie transfer is on hold.

Importance of strong relationships. An EPA official indicated that in the initial stages of the Fort Ritchie closure/transfer process, the parties involved disagreed on some key issues. The BRAC Office of the Military District of Washington was under pressure to shut down Fort Ritchie quickly, and there was little understanding of the potential issues involved with UXO. To help build a working relationship, the BCT took part in facilitated partnering exercises, and within a year the parties had a common understanding of the key issues and the desired end result of the processes they were undertaking. Both Army and EPA officials have noted how these strong relationships, established early in the process, were critical in allowing disagreements to be resolved and in expediting the work of the various teams. Even outside these core teams, EPA and Army officials worked together closely to ensure that appropriate experts were involved early on, reducing the amount of work that would have had to be redone if that involvement had only occurred later, in a review role.

Public education. Finally, public education efforts have played an important role at Fort Ritchie, especially in light of the UXO discovery on lands occupied by civilian residents. In addition to the efforts put forth to educate these residents to ensure their safety, part of every land transfer at Ritchie will involve explicit public education to inform new landowners or lessees about the past use of the land, the types of activities that the land can safely support, and the types of activities that would require special permits or subsequent inspection or clearance.

In each of these examples, the roles that the Army and the EPA played were important in successfully cultivating these relationships. In particular, the priority that the Army placed on creating and operating a fair, inclusive set of processes—without having to yield its final authority on Army matters—encouraged the community, including environmental regulators, to trust that they could protect their interests by working with the Army rather than against it. In sum, effective partnerships (between the public/private sector and PenMar, between PenMar and the Army, among the BCT and RAB members, and between the Army and the public via public education

activities) have been the key enablers of what appears to be an effective closure, clearance, and transfer process at Fort Ritchie.

APPENDIX I

Fort Sheridan, Illinois: Limited UXO Problem, High-Value Real Estate Facilitate Transfer

In the Fort Sheridan case, the transfer of land containing UXO has been possible because the amount and hazards of UXO were very limited and because the installation occupied some of the most valuable real estate in the state of Illinois. The small number of recipients (two) involved in the transfer negotiations also facilitated the process.

Base History

The U.S. military purchased the Fort Sheridan property in the late 1880s. Its primary purpose was to protect and maintain order in the city of Chicago. Fort Sheridan hosted the nation's first Reserve Officer's Training Corps camp in the summer of 1917. During World War II, the installation served as one of only four reception centers for new recruits in the United States. Recruits received training, including weapons training and training on a simulated battlefield where dynamite was used to simulate battlefield explosions. Most of the weapons ranges on the installation were used only for small arms, but there were three artillery ranges. The aiming points for all three were floating targets on Lake Michigan. Millions of artillery rounds were fired at these floating targets. Fort Sheridan also housed Nike missiles during the late 1950s and early 1960s.

Interviews and research for this case study were conducted by Jacqueline MacDonald.

Fort Sheridan's recruit training mission ended after the Vietnam War, and the installation became primarily an administrative center. The 1988 BRAC Commission designated Fort Sheridan for realignment. The DoD retained 306 of the original 712 acres for use by the Army and Navy reserves. The rest of the land became available for reuse and was transferred to the Lake County Forest Preservation District and the local redevelopment authority.

Land Reuse

Fort Sheridan occupies prime real estate on the shores of Lake Michigan, north of Chicago. The neighboring communities of Highland Park, Lake Forest, and Highwood are some of the most expensive in Illinois. Prior to the closure of part of Fort Sheridan, no new lake-front communities had been established for 100 years, because no coastal land was available. As a result, demand for the Fort Sheridan real estate and incentives for developing it were high. For example, on one section of the former base, all 37 new single-family homes sold within two weeks in 1998, just five years after base closure.

About half of the acreage transferred to the local reuse authority. The local reuse authority then sold the property, reportedly at bargain prices, to four private developers, with requirements for preserving many of the historic buildings and grounds. The new development is essentially complete. The transferred acreage has been converted to a carefully planned community consisting of 551 homes, townhouses, and condominiums. The starting price for a new single-family home is \$649,000.

The Lake County Forest Preservation District is converting most of the rest of the land to an 18-hole golf course designed by a well-known architect. A portion of the land also will be open space with walking trails.

The presence of UXO has had little effect on land reuse at Fort Sheridan. As noted above, the targets for heavy artillery were located on Lake Michigan, so the UXO density on land is extremely low. According to the installation's BRAC environmental coordinator, only

about a dozen UXO items other than small-arms ammunition were found on shore. This translates into a density of 0.14 UXO items per acre on the 86 acres suspected of containing UXO.

Equally important in promoting land transfer, however, was the high value of the lakefront land. Even though the number of UXO items found was small, according to a risk assessment prepared for the former Lake Michigan impact area, UXO from the lake bottom occasionally washes ashore in areas that are now publicly accessible beaches. The Army is addressing this risk by conducting annual, visual surveys of all publicly accessible areas. Nonetheless, were it not for the high value of the property, this residual risk might not have been acceptable.

UXO Clearance

According to the installation's BRAC environmental coordinator, land areas with UXO were surveyed to a depth of either one or four feet, depending on planned uses. Some areas could not be surveyed due to the presence of construction debris. The BRAC environmental coordinator also noted that the EPA and the Illinois EPA did not play a role in approving the clearance process because the clearance was conducted as a time-critical removal action, which minimizes regulatory oversight in situations where there is no time to safely conduct reviews due to the imminent threat of the hazard.

Conclusions and Observations

The extremely high value of the Fort Sheridan property as well as the small number of live UXO items found contributed to the rapid transfer of the UXO land at Fort Sheridan. The entire redevelopment process was completed within ten years of base closure. It is likely that the high value of this land contributed to the recipients' willingness to accept some risk from UXO that might wash ashore or surface later. As well, the small number of parties involved probably contrib-

uted to the efficient nature of the transfer at Sheridan. The Army was able to convey all the BRAC acreage to just two entities: the local re-use authority and the Lake County Forest Preservation District.

APPENDIX J

Jefferson Proving Ground, Indiana: Army Retains Ownership Due to UXO

At Jefferson Proving Ground, initial plans called for the transfer of nearly all acreage outside the military, including acreage containing high densities of UXO. However, the designated land recipients withdrew their claim to the land because of the contamination. Because the Army has determined that cleanup of most of the UXO acreage is infeasible, it now must maintain ownership in perpetuity or until better UXO detection and clearance technologies become available.

Base History

Jefferson Proving Ground (JPG) was established on October 8, 1940, by the War Department as a proving ground for the production acceptance testing of ordnance for the U.S. Army.¹ JPG is situated in southeastern Indiana, approximately 8 miles north of the Indiana-Kentucky border, near Madison, Indiana. It occupies parts of three counties in Indiana and comprises 55,264 acres in a roughly rectangular configuration 17 miles long (from north to south) and from 4 to 6 miles wide. The surrounding area is largely woodland and farms, with some small towns and rural residential areas.

Interviews and research for this case study were conducted by Jimmie McEver.

¹ *Jefferson Proving Ground Final Environmental Impact Study*, p. 4-1, September 1995.

From 1941 until 1994, JPG was involved in the testing of conventional ordnance of all types used by the Army. Testing included bombs up to 2,000 pounds, 8-inch artillery shells, mines, mortars, grenades, tank rounds, etc., but did not include any live chemical or biological ordnance. The Army's final Environmental Impact Study estimates that approximately 23 million rounds were fired on JPG over its lifetime, and that there remain approximately 1.5 million artillery rounds that did not detonate and another 7 million ordnance pieces of other types with live detonators, primers, or fuses. Depleted uranium (DU) munitions were also fired at JPG, onto a three-square-mile parcel designated for that purpose. From the time DU test firing began in March 1984 until base closure, more than 100,000 kilograms of DU were fired in the form of 105mm and 120mm tank ammunition.

JPG can be divided into two areas: a northern firing range and a southern cantonment area. These two areas are separated by an east-to-west firing line² that runs across the width of JPG. The firing range encompasses 51,000 acres of undeveloped and mostly wooded land (though some areas were cleared for munitions test targeting). The cantonment area takes in the remaining 4,000-plus acres of JPG and was used for administration, ammunition assembly and testing, maintenance, and housing. Also in the cantonment area is an abandoned airport with four runways and a hangar building. JPG contains 379 buildings, 182 miles of roads, and 48 miles of boundary fencing.

In December 1988, the BRAC Commission recommended closure of Jefferson Proving Ground. According to Army officials, probable reasons for JPG's selection in the BRAC process were a significant reduction in workload for conventional ordnance testing facilities like JPG and the ability to shift ordnance production acceptance testing functions to other Army facilities. JPG did not have congressional champions in the BRAC process. JPG officially closed in 1995.

² The firing line is made up of 268 former gun positions used for ordnance testing.

Land Transfer and Use

Before land on bases designated for closure can be transferred to other owners or otherwise designated for non-Army use, the property must be screened to determine potential demand by subsequent users, including other military services, other federal agencies, state and local government agencies, and the like. Following this step, any unclaimed land may be designated for sale by the Army to private interests. Regardless, the Army must determine the suitability of the land for its potential future uses and, if slated for transfer (to public or private interests), follow a process of land study, clearance, and remediation (if needed) of UXO and other hazardous substances and materials, and certification and definition of the land's safe use.

The Northern Firing Range

Early on, the U.S. Fish and Wildlife Service (USFWS) expressed an interest in obtaining the greater part of the firing range for use as a wildlife refuge. Subsequently, however, the USFWS withdrew its offer due to the presence of UXO and depleted uranium in the area. Instead, the Army and USFWS have entered into a memorandum of understanding (MOU), under which USFWS will manage 50,000 acres of the former JPG firing range as a national wildlife refuge, with the Army retaining ownership. In 2000, this area was designated as the Big Oaks National Wildlife Refuge.

The Army has also entered into an MOU with the U.S. Air Force, under which the Indiana Air National Guard will be permitted to use the remaining 1,000 acres of the firing range land as a training range.

Even though the 51,000 acres north of the firing line will be managed and used by non-Army agencies, the Army retains responsibility for the UXO remaining on the old firing range lands. Should UXO be discovered on the USFWS/service-administered lands north of the firing line, the MOU outlines procedures for remediation. If the UXO is found to pose an immediate threat, USFWS can call for an "emergency UXO clearance," in which the Army will promptly detonate and destroy the UXO item. Additionally, USFWS can re-

quest nonemergency UXO clearance, which allows for the identification of future needs. To fulfill a nonemergency request, the Army will determine whether the requested UXO removal can be used by Army or Reserve units as a training exercise and, if so, one of these units will clear the UXO.

The Southern Cantonment Area

South of the firing line, approximately 4,000 acres were deemed suitable to transfer. When the process for determining other public-sector interest was complete, expressions of interest had been made by the following organizations:

- City of Madison, Indiana: 1.19-acre parcel for a pump station (pump station building and two well houses are included in the parcel).
- Madison (Indiana) Port Authority: Small parcel including a 10,000-square-foot building and adjacent parking lot, as well as railroad tracks.
- Defense Reutilization and Marketing Office: 5.7-acre site, including one building.
- Jefferson County (Indiana) Board of Commissioners (via National Park Service, U.S. Department of the Interior): 230-acre parcel for use as a county park, including Krueger Lake, picnic facilities, and playground area.
- Jefferson County Board of Commissioners: Western wooded parcel (acreage unknown), requested via a public benefit conveyance.³

These expressions of interest left approximately 3,400 acres unspoken for. It should be noted, though, that, after JPG had been se-

³ This transfer request was subsequently withdrawn. This parcel did contain UXO, which was cleared via a non-time-critical UXO removal process, and a decision is currently pending at DoD as to whether this parcel should be transferred to the county (which submitted a subsequent request after the parcel was cleared) and a local developer who won a bid for much of the remaining portion of the cantonment area.

lected for closure, a JPG Regional Development Board (Local Redevelopment Authority, or LRA) was formed, which submitted an economic reuse plan for the entire JPG site. Primary development was to take place in the southern cantonment area, but the plan also suggested the possibility of using some firing range acreage for agribusiness purposes (e.g., one such business mentioned was an egg plant). The Army rejected the LRA's reuse plan, however, citing it as infeasible, and then placed the 3,400 remaining acres south of the firing line up for auction. The winning bid came from a local developer, who bid \$5 million for the entire 3,400-acre parcel and its buildings.

As the southern land was surveyed in preparation for transfer, more UXO was discovered than expected (mostly mortars, mines, and small arms), although some parcels contained no UXO at all (the city of Madison pump station, the Madison Port Authority's facility, a paper mill and nearby acreage transferred to the local developer as part of his 3,400-acre acquisition, and Krueger Lake Park—all of which were being used at the time of closure).⁴ As additional parcels of land were cleared of UXO and had their FOSTs (Findings of Suitability to Transfer) approved, they were transferred to the local developer (a process that is still ongoing). To date, all of the land slated for transfer to public entities has been transferred (none contained UXO), and 1,247 acres of the 3,400 acres to be transferred to the private developer have been transferred (100 acres containing UXO were cleared, and 1,147 acres were not). An additional 770 UXO-containing acres were scheduled to be transferred to the private developer in April 2003 but have not yet changed hands. Throughout this process, the local developer was able to work with the Army to establish the order in which the UXO-containing lands were cleared so as to best meet his reuse needs. These parcels were cleared as time-critical UXO removals, allowing for a more streamlined administrative process for the Army.

⁴ Krueger Lake Park was created by JPG staff and used as a recreational area on the base while it was operating.

The parcels owned by the private developer see a variety of uses: farming, small industry, and residential. The Indiana Department of Transportation (DOT) recently acquired 40 acres from the developer and operates a highway maintenance facility on the premises.⁵ The developer is attempting to attract outside interest in larger development projects for the space. For example, there have been proposals to locate a landfill or small-scale “midget” racing facility on the former base, but no such large projects (with the exception of the Indiana DOT facility) have emerged thus far.

Stakeholder Involvement: The Restoration Advisory Board

At the beginning of the JPG BRAC implementation process, invitations to individuals in the community (local government, business, environmental concerns, health professions, etc.) were extended for participation in the RAB. At that time, there was quite a bit of interest from the community, but after the LRA plan was denied and the single local developer won the bid for the available land, business interest dropped off to almost nothing (possibly indicating why business people were interested in the first place). Local business people were embittered by the rejection of the LRA plan and the subsequent sale of the land to one individual. (This sentiment persists, even years later, as locals see the Army spend time and money to clear land of UXO solely for the benefit of one person.)

Currently, the RAB comprises mostly representatives from public health organizations, environmental concerns, and some civic-minded individuals. The RAB currently meets quarterly (though earlier in the process it met monthly), and its discussions and activities are transcribed and retained in an administrative record.

⁵ Indiana DOT, as a state agency, could have acquired the land directly from the Army via a no-cost public transfer if it had submitted a transfer request at the beginning of the process.

The RAB serves in a liaison role between the Army and the local community, and also functions in an advisory capacity. It has no direct authority, but the Army is required to consult with and listen to the RAB.

The U.S. Environmental Protection Agency and the Indiana Department of Environmental Management were involved in this process via the public participation sequence followed in the environmental impact statement for land reuse and disposal. Disposal of individual parcels within the cantonment area was conducted via the FOST process, with opportunity for public review and comment on specific parcels.

From the perspective of at least one local RAB participant, all external stakeholders were involved through the RAB. Thus, land was screened, cleared, and certified via a U.S. Army/DoD process in which the EPA and Indiana Department of Environmental Management played only advisory and review roles. Their circumscribed roles were due in some part to the Army's use of time-critical UXO removal procedures; processes with more formal federal and state environmental regulatory participation are required for non-time-critical UXO removal.

Conclusions and Observations

Given the size of JPG, its history, and the large amount of UXO present, it would be reasonable to expect the JPG BRAC and UXO clearance processes to have been extremely complex. On the contrary, the details of JPG's use and the transfer of reusable land largely to a single source seem to have rendered the process relatively straightforward.

The immediate determination of the infeasibility of clearing the large firing range of UXO resulted in its designation as a national wildlife refuge and Indiana Air National Guard training range, with management functions falling to those agencies and continuing UXO responsibility remaining with the Army.

In the southern cantonment area, some public agencies received small parcels of land (none of which contained UXO), but the overwhelming portion of this part of JPG (and all of the southern area designated for transfer that required UXO clearance) was sold to a single private developer. Since there were no conflicts among potential multiple transferees, the Army could work with a single individual to schedule land clearance and transfer. Further, the Army was able to use time-critical UXO removal procedures, which greatly streamlined administrative requirements during the removal process.⁶ Although federal and state environmental agencies seem not to have played an authoritative oversight role (participating only in review/advisory functions), this process seems to have flowed smoothly and been handled well from the point of view of the Army and the local RAB. That said, both Army and RAB associates interviewed noted the extreme lengths of time required for the clearance/transfer process. Though JPG closed in 1995, some land transfers are still pending.⁷

Despite the relatively smooth process, there were still some bumps along the way. The Army's rejection of the local reuse plan generated some hard feelings in the local business community, which subsequently saw no need to participate in the RAB process. The denied reuse plan most likely carries some lessons for local officials as well, highlighting the need for cooperation and planning to develop and propose realistic plans for the redevelopment of BRAC land that add public value to the area. This suggests that perhaps the Army (or another federal or state agency) could do more to help local communities respond effectively and in the public interest to future base closings.

⁶ An Army official noted in an interview that since JPG was one of the first bases to be closed and there was little experience with clearing and transferring UXO-containing lands, the Army was probably able to utilize some processes (such as the time-critical UXO designation) that would be more difficult to use today.

⁷ The time required for transfer seems not to be problematic for the local developer. RAB indicated that the time-staggered transfers have allowed the local developer to work in stages and avoid having to generate a large amount of capital all at once.

Another ongoing issue alluded to earlier was the presence of depleted uranium at JPG. While some removal efforts have taken place, the presence of UXO currently renders DU cleanup infeasible at this time. The Army had applied to have its license for DU terminated by the Nuclear Regulatory Commission, allowing the current DU to remain in place with perpetual access controls to prevent exposure to individuals. After discussions with the NRC and a local environmental organization, Save the Valley, the Army has subsequently amended its request for termination to instead ask the NRC to change the Army's license to one for possession. This would allow the Army to keep the DU in place with currently planned access control, but requires the Army to monitor the area to ensure against groundwater contamination and other material mobility. The license would have to be renewed periodically, allowing for reexamination of emerging technology that might allow the Army to collect and dispose of the DU at some point in the future. This compromise was possible because of the good working relationship and lines of communication that exist between the Army officials responsible for JPG cleanup/transfer and the local RAB, and is another indicator of the overall success of this BRAC implementation.

APPENDIX K

The Presidio of San Francisco, California: Discovery of UXO After Transfer Illustrates Need for Improved UXO Data

Before transfer, the Army and land receivers thought the Presidio was free of all UXO except small-arms ammunition. The new landholders discovered UXO during revegetation, causing the Army to have to return to the site to conduct new investigations.

Base History

The Presidio has a long history extending back thousands of years to when it was home to the native people known as Ohlone. The Spanish arrived in 1776 and established the Presidio as a military outpost of their empire in western North America. Mexican troops occupied the post after they gained their independence from Spain in 1821. The U.S. Army took official control of the Presidio in 1848 after winning the Mexican War.

The Presidio of San Francisco was the headquarters for the Sixth U.S. Army and was home to a major Army hospital, a pioneering airfield, and an extensive coastal defense system. In 1963, the Presidio was registered as a national historic landmark and was listed on the National Register of Historic Places in 1966. The Presidio is located on San Francisco Bay with scenic views of the city, Golden Gate Bridge, Angel Island, and Alcatraz Island. The installation covers

Interviews and research for this case study were conducted by Noreen Clancy.

1,480 acres of land and includes 510 historic buildings, a national cemetery, rare and endangered species, forests, beaches, and spectacular vistas.

BRAC History

In December 1988, the BRAC Commission recommended closure of the Presidio because the installation could not expand and its functions could be relocated. The Presidio was transferred from the Army to the National Park Service in October 1994, although the Army retained responsibility for cleanup of the installation.

In 1996, the U.S. Congress created the Presidio Trust, a quasi-governmental body that works in partnership with the National Park Service to manage the park collaboratively, although the Park Service maintains ownership of the properties. The Presidio Trust manages the interior 80 percent of the park, including most of its historic structures. The National Park Service manages coastal areas and provides visitor and public safety services throughout the park. Congress gave the Trust the authority to lease property and generate revenues and mandated that the Trust become financially self-sufficient by 2013 or risk being transferred to the General Services Administration and sold.

Land Use

How the land at the Presidio would be used once it was no longer a military base was never open for debate. In 1972, Congressman Phillip Burton authored legislation stating that the Presidio would become part of the Golden Gate National Recreation Area if the Department of Defense ever determined the base to be in excess to its needs. All 1,480 acres of land in the Presidio were transferred to the National Park Service after closure to become part of the Golden Gate National Recreation Area.

Since 1846, during wartime the Presidio had served as a training site for the Army's infantry, cavalry, and field artillery personnel. The Presidio also served as a stopover for Army personnel heading overseas. The ten ranges on the site were small arms (rifle, pistol, and machine gun) ranges used for target practice. The ranges typically had a firing line that a soldier stood behind to shoot at a stationary target area or at a moving skeet. Use of the ranges stopped by the 1960s. A very small fraction of the land was used for small arms training, and the remainder was believed to have been used for administrative purposes. All ranges were included in the transfer to the National Park Service in 1994, although the Army retained responsibility for environmental cleanup.

The Army conducted a Final Closed, Transferring, and Transferred Range (CTT) and Site Inventory Report on the Presidio in December 2002. This report inventoried the ten CTT ranges and determined that "no UXO-DMM-MC [unexploded ordnance-discarded military munitions-munitions constituents] were identified." The cumulative size of the ten ranges is approximately 17 acres, or about 1 percent of the land. The CTT inventory team performed "an assessment of explosives safety risk using the Risk Assessment Code (RAC) process for each CTT military range, UXO, and DMM site in the CTT inventory." All of the Presidio ranges were given a RAC score of 5, negligible risk, indicating that no DoD action was necessary.

Although no parcels of land are identified as containing UXO, the odd UXO have been found at the Presidio. These include vintage Civil War-era shells and other unexploded shells found in the middle to late 1990s. When these odd pieces of ordnance were found, the Army Corps of Engineers was called and an Explosive Ordnance Disposal team from Moffett Field was brought in to handle the ordnance and cleanup of the immediate site.

In 1994, the National Park Service developed a General Management Plan Amendment for the reuse of the Presidio. That plan outlined expansion of recreational space with some leasing of real estate to "a network of national and international organizations devoted to improving human and natural environments and addressing our

common future.” Congress rejected this plan as unrealistic, since it relied heavily upon taxpayer support.

When the Presidio Trust was established in 1996, the management plan for the reuse of the Presidio was revised to be more focused and realistic in reaching its congressional mandate of being self-sufficient by 2013. The Trust’s management plan was two years in the making, with heavy community influence through public meetings and open comment periods on draft documents. The management plan emphasizes preservation and restoration of natural habitats. Long-term preservation of the park will be supported by reuse of historical buildings by a community of park residents and office tenants.

Cleanup: A New Precedent

Centuries of past military activity have left an imprint on the Presidio, requiring environmental restoration. The principal type of remediation required is soil remediation, owing to elevated lead levels and leakage from fuel distribution systems.

Every remediation decision can affect the site’s reuse as a national park. In 1999, in an unprecedented move toward privatizing cleanup, the Army transferred the responsibility for the cleanup to the Presidio Trust. Through a memorandum of agreement (MOA), the Presidio Trust, the National Park Service, and the Department of the Army agreed to guarantee an accelerated environmental cleanup of the installation. Under the agreement, the Army will pay the Trust \$99 million over four years for environmental remediation throughout the park. In addition, the Trust secured a \$100 million insurance policy to cover unanticipated overruns in cleanup costs.

This agreement marks the first successful transfer of environmental cleanup of a closed military base to a public-private partnership. The Presidio Trust’s goal for the environmental remediation program is to work with the public, the National Park Service, and regulatory agencies to clean up the Presidio to the high standards suitable for a national park.

This transfer arrangement is seen to benefit both sides. The Trust will perform all cleanup activities and can select remedies that are appropriate to its reuse plan. There are often congressional limits on use of funds appropriated to the military, so the Presidio Trust should have more freedom in its cleanup options. It is anticipated that cleanup of the park by the Trust will be completed in seven to ten years rather than the 30 years originally projected by the Army. The \$99 million price tag is thought to be less expensive than if the Army had performed the cleanup.

During the cleanup process, regulatory guidance is provided by California's Department of Toxic Substance Control, the Regional Water Quality Control Board, and the U.S. Environmental Protection Agency. These agencies will work with the Trust and the Restoration Advisory Board (composed of regulatory agency members, key stakeholders, and community members) to ensure that cleanup of the Presidio is conducted to a degree suitable for a national park.

The Trust will follow the CERCLA process for the investigation of and response to hazardous substances that could endanger human health and the environment. This begins with a preliminary assessment of the site and moves to a site inspection and remedial inspection if investigation is warranted.

In 1997, the Army completed its final feasibility study for the Presidio main installation sites. The Trust is now revising and updating that feasibility study primarily to incorporate alternative remedial actions that are protective of human health and the environment, are cost-effective, and allow proper reuse of the Presidio. These preferred alternative remedial actions will be included in the remedial action plan, which is the proposed cleanup plan. The remedial action plan will be presented to the community for public review.

Lessons Learned from an Unexpected Find

Under the MOA between the Army, the National Park Service, and the Presidio Trust in which management and environmental responsibility for the Presidio was transferred to the Trust, the Army re-

tained responsibility for any chemical, biological, or radiological material that might be found or any unknown sites that may be discovered, such as an underground bunker.

Late in 2002, during a revegetation effort in an area known as Inspiration Point, four vials of mustard gas were found. The Trust fenced off the area and called the Army Explosive Ordnance Disposal team for assistance. Those four vials were discovered to have been a training kit for chemical weapons. This incident prompted the Army to request an archives search report (ASR) on the entire Presidio site. An ASR is an extensive historical research review including aerial photographs. This particular review is focused on discovering clues about the sources of ordnance and chemical weapons at the Presidio. The review was under way at the time this report was being written.

Preliminary findings from this ASR reveal foxholes in old aerial photographs, suggesting that a training ground may have been present. Further investigation uncovered that in the early 1950s the Sixth Army Chemical, Biological, and Radiological School was located at the Presidio, which would explain the discovery of the mustard gas training kit. Because of information being uncovered about activities that occurred at the Presidio before World War I, it is possible that UXO may still be discovered. Depending upon the outcome of the complete ASR, further assessments of particular areas for ordnance and chemical, biological, and radiological weapons may be warranted. It is up to the Army to prove that these areas are free of any potentially harmful materials.

According to the Army point of contact, the lesson here is to "always complete an extensive ASR as a first step in any BRAC." This would insure against most surprises like the mustard gas find. The files generally reviewed for transfer of BRAC land often contain poor documentation of historical uses of the land and cannot be considered comprehensive.

When the Presidio was selected for closure in 1988, conducting an ASR was not commonplace short of a compelling reason to believe the land posed a potential threat to human health and the environment. Moreover, the Presidio was primarily thought of as an administrative installation with only a modicum of small-arms firing ranges.

APPENDIX L

Savanna Army Depot, Illinois: Lack of Standards Delays Transfer

The Savanna case illustrates how the lack of UXO survey and removal standards as well as insufficient citizen and regulator involvement in early planning stages can prevent land transfer and reuse. At Savanna, no acreage has transferred, although the local reuse authority is leasing buildings in areas not containing UXO. The depot is entirely closed to the public “due to the potential unacceptable health and safety risks posed by the unexploded ordnance and other contaminants on the site,” according to a brochure on public access restrictions from the Illinois Environmental Protection Agency. A total of 13,062 acres await cleanup and final disposition; 5,590 of these acres may contain UXO.

Base History

The military opened this installation in 1917 as the Savanna Proving Ground, to test weapons manufactured by the Rock Island Arsenal. The military purchased the land because at that time it was remote and contained a large expanse of sand, making it ideal for weapons testing. Later, operations expanded to include ammunition storage, maintenance, and distribution. According to a report by the Army Corps of Engineers, “Since [Savanna] opened . . . nearly every item

Interviews and research for this case study were conducted by Jacqueline MacDonald.

from the United States stockpile and some foreign items have been in storage at the depot.”

During World War II, Savanna became one of the nation’s largest munitions depots. Hundreds of earth-covered igloos and other structures stored ammunition. A civilian workforce of more than 7,000 worked around-the-clock assembly lines to load bombs, shells, and other ammunition with explosives and chemical weapons agents.

With the end of the war, the depot’s mission changed from weapons manufacturing and distribution to weapons storage and demilitarization. Ammunition returned from Europe and Asia in large quantities was stored at the site, overflowing the capacity of the available magazines. Assembly lines that had been used for loading weapons with explosives were converted to lines for pulling apart munitions and removing the explosives. The civilian workforce dropped to 900 by 1947.

The workforce expanded once more, to about 3,000, and manufacturing resumed from 1951 until 1953 in support of the Korean War, before shrinking once again. Similarly, activity increased during the Vietnam War, with a civilian force of about 1,300 in 1967, but was curtailed after the end of the war. Operations continued to shrink during the 1970s and 1980s.

The base was identified for closure in 1995 and officially shut its doors in 2000.

Savanna Army Depot is located on the eastern bank of the Mississippi River, seven miles north of the town of Savanna, Illinois. The depot contains one of the nation’s only remaining savannas and the most extensive remaining in Illinois. (A savanna ecosystem consists of stands of trees intermingled with tall grasses, and such habitats once covered much of the Midwest.) It also contains the last significant remaining sand dune system along the Mississippi. Although a portion of the installation contains roads and buildings, some 5,500 acres of sloughs and river backwaters and 4,500 acres of savanna and prairie remain undeveloped. Dozens of state and two federally listed threatened and endangered species use the habitat. Several hundred bald eagles roost there en route north in the spring.

Based on existing surveys, the Army estimates that approximately 5,600 acres of the depot may contain UXO. This estimate is uncertain, because comprehensive surveys have not been completed. UXO is present at former munitions disposal and open burning or detonation sites, on areas used for military training, and at former weapons testing sites.

Land Reuse

Currently, almost all of the Savanna Army Depot is off limits to the public. The Jo-Carroll Depot Redevelopment Authority is leasing about 500 buildings on non-UXO-affected land; these are sublet to warehousing and light manufacturing operations as well as a photo studio. The U.S. Fish and Wildlife Service maintains a small staff (about six employees) for natural resources management activities.

Although no land at Savanna has transferred yet, the land-reuse plan calls for future disposition as follows:

- 2,930 acres to the Jo-Carroll Depot Redevelopment Authority for industrial and commercial use;
- 9,404 acres to the U.S. Fish and Wildlife Service, to become part of the Lost Mound National Wildlife Refuge;
- 270 acres to the Illinois Department of Natural Resources for a public park; and
- 356 acres to the Army Corps of Engineers for use in recreation and dredge disposal.

Land-Reuse Planning Process

Disposal of the land at Savanna followed the legislatively mandated process in which the land was offered first to other DoD components, then to other federal agencies, and then to the local reuse authority. Several contentious meetings involving local officials, the U.S. Fish and Wildlife Service, the Illinois Department of Natural

Resources, and the Army occurred before the final land-use plan was signed. USFWS had first choice of land, except for the small portion claimed by the Army Corps of Engineers; debates occurred over how much of the land the USFWS should share with others interested in the property, which land they would be willing to share, and whether they would impose wildlife restrictions.

Effect of UXO on Land-Reuse Planning

According to the Army BRAC environmental coordinator for Savanna, and the citizen co-chair of the Savanna Restoration Advisory Board (RAB), the presence of UXO was not considered in planning future land uses. The land-use plan has been only slightly modified in response to increased information about UXO. A parcel in the middle of the savanna habitat that was to house a new prison will now go to the Fish and Wildlife Service, and the prison facility will be constructed off the installation. This change was made due to concerns among environmentalists that construction of the prison would damage the ecosystem. Although the land-use plan has not changed to account for UXO, the designated recipients, including USFWS, have indicated that they will not accept title to the land until the Army cleans it up.

UXO Clearance

The UXO investigation and removal process at Savanna is considered to be in its infancy. Further, the Army and the EPA have been unable to agree on an appropriate clearance protocol. According to an EPA fact sheet, "There is currently a significant national debate between regulatory agencies and the Department of Defense relating to the scope and methods of investigation for potential UXO. As such U.S. EPA could not reach agreement with the Army regarding the efforts at Savanna."

Until recently, the Army and EPA also disagreed on what process should be used to survey the installation to characterize the distribution of UXO. The Army Corps of Engineers (Huntsville) divided the site into grids and surveyed 3 percent of the grids for UXO. The Army's plan was to use those results to model UXO locations and distribution across the installation, using one of two software packages developed by the Corps (SiteStats/GridStats or UXO Calculator). However, the Illinois EPA and U.S. EPA both objected. The Army then negotiated a new strategy with the regulators. The survey process will vary depending on the prior uses of the land and the current vegetation status. Some areas, such as former detonation or firing points, will be surveyed using a spoke-and-wheel approach, in which the perimeter and "spokes" radiating from the center of the site will be surveyed. Other areas (those that are forested) will be surveyed along random, meandering swaths of land. Results from the spoke-and-wheel and random path surveys will then form the basis for estimates of UXO distribution across the installation.

Conclusions and Observations

The Army BRAC environmental coordinator suggested that future base closures should account for the cost of cleaning up and transferring UXO-contaminated land. "Smoke and mirrors won't make the problem go away. It needs money," he observed. The current "official" estimated cost for the cleanup of Savanna is \$200 million, of which the UXO remediation is estimated to cost \$40–\$50 million. However, the actual cost could be higher. In 2003, the government allocated only \$2.8 million for UXO cleanup at Savanna, and the budget will be cut in 2004, according to the Army BRAC environmental coordinator. At the 2003 spending rate and assuming the estimated \$40–\$50 million total cost estimate is accurate, cleaning all the UXO sites will take 14–18 years.

The environmental coordinator also suggested that for each installation considered for closure, an ASR should be completed before the final closure decision. Savanna was identified for closure in 1995,

but the first draft of the archives search report was not completed until 1997, and thus the full extent of environmental contamination was unknown at the time of the closure decision. Further, the quality of the ASR needs to be improved. The environmental coordinator said that in the future, he would like to be able to hire a contractor to conduct the archives search and would like to write the scope of work himself, instead of having the Army Corps of Engineers, Huntsville, carry out the task. The report that Huntsville provided to him was of poor quality, and regulators could not understand it, he indicated. In addition, in some cases the report was overly conservative in its estimates of UXO acreage, he said. For example, range fan sizes were much larger than necessary. The Corps of Engineers, for instance, had indicated that one range fan extended across the Mississippi River into Iowa. Outside experts hired to assess that range were able to substantially trim the assumed UXO acreage (eliminating all Iowa land from the list). The regulators concurred with the revised estimates, and a contractor was hired to rewrite the archives search report, but the revised version was not available until 1999—too late to be of use for land-use decisions.

Finally, the environmental coordinator suggested that the Army needs to recognize that the EPA does not regard the Army as the final authority on safe disposal of UXO. The Army needs to involve the EPA and state agencies in the upfront planning.

The RAB member recognized that citizen involvement needs to improve as well. He said that the Army has attempted to use the RAB as a “rubber stamp” rather than involving the members in decision-making. As a result, many board members have quit in frustration. Further, on a number of occasions, the Army’s information has not been accurate. A RAB member cited several instances in which the Army denied that a particular type of contaminant was present, only to be proved wrong. For example, the Army denied that chemical weapons were buried at Savanna, but a local community member once employed by the depot testified that chemical weapons agents had in fact been disposed of on site. On several occasions, survey crews have unearthed contaminants (including radionuclides and a

large pesticide dump) whose presence the Army had long denied. As a result, RAB members are skeptical of Army claims.

A RAB member suggested that a moratorium on military base closure should be imposed until the federal government allocates enough money to clean up the bases that have already been closed. He suggested that cleanup at Savanna has proceeded at a glacial pace due to lack of funding. The process has accelerated since formation of a "SMART" (Strategic Management, Analysis, Requirements, and Technology) team involving the Army, EPA, Illinois EPA, Fish and Wildlife Service, Illinois Department of Natural Resources, Jo-Carroll Depot Local Redevelopment Authority, and a citizen representative was formed to provide an arena for reaching agreement on cleanup issues. However, he said he believed the main reason for the team's success is that it has been able to ensure that more funds are allocated to Savanna.

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In the ongoing Base Realignment and Closure (BRAC) process, lands containing unexploded ordnance (UXO) left over from military training have proved particularly difficult and costly to transfer to new users. With a few exceptions, little progress has been made in transferring these lands. This monograph chronicles both the issues that facilitated the transfer of UXO-contaminated lands and those that slowed the transfer, and it offers options for expediting the transfer of these lands.

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