Association of State and Territorial

ASTSWMO

Solid Waste Management Officials

Analysis of Interim Risk Management at Munitions Response Sites

FINAL REPORT

June 2013

State Federal Coordination Focus Group
Federal Facilities Research Center

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I.   INTRODUCTION

On January 9, 2013, the State Munitions Response Forum (MRF) released an issue paper titled, "Interim Risk Management: States' Position." The paper discusses the States' concerns with how munitions response sites (MRSs) in the Department of Defense's (DoD's) Military Munitions Response Program (MMRP) are managed during the period between initial identification as a MRS to the time when there is a remedy in place (RIP) or response complete (RC).[1] According to the MRF, estimates show that decades may pass between the discovery of a MRS, investigation, and RIP/RC. As stated in the MRF Paper, MRSs require specialized interim risk management (IRM) due to the potential explosive safety hazards posed by munitions, which differs from routine management used at chemically contaminated sites.

The MRF Paper recommends that:

> DoD, working with the States, design, fund and support implementation of a risk management framework that includes processes and/or procedures to manage the potential risk posed at a [MRS] until such time as (1) the [MRS] is investigated and a determination is made that munitions do not pose a hazard; or (2) a remedy is in place or a response is complete.

The MRF provides a number of recommendations and suggestions for elements that should be included in a successful risk management framework. Among them:

- Determining roles and responsibilities among various stakeholders for implementing IRM at MRSs no longer under DoD control;
- Developing a funding approach for IRM;
- Identifying the various types of risk management tools that can be tailored to site specific factors;
- Providing explosives or munitions emergency response support;
- Implementing a notification process with property owners and public officials;
- Implementing community education and outreach about explosive safety;
- Establishing a national program for DoD Military Component construction support at MRSs;
- Providing support for wildfire and controlled burns; and,
- Tracking, analyzing, and addressing munitions-related incidents.

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[1] MRS and munitions site, which are used synonymously, mean a discrete location that is known to require a munitions response because it is known or suspected to contain munitions and explosives of concern (MEC). MEC distinguishes specific categories of military munitions that may pose unique explosives safety risks, such as unexploded ordnance (UXO), as defined in 10 U.S.C. 101(e)(5); discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or munitions constituents (MCs) (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard [32 CFR Part 179].

The ASTSWMO Federal Facilities Research Center's State Federal Coordination Focus Group conducted the research presented in this report to support the development of a national IRM framework proposed by the MRF as well as to gain an understanding of the IRM processes currently being implemented. In 2012, the Focus Group requested IRM data from States and federal agencies (U.S. Environmental Protection Agency (EPA), DoD, Department of Interior, and Bureau of Land Management) on IRM controls and elements being implemented. Areas of interest included:

- DoD policies for IRM and the funding of IRM activities at MRSs;
- IRM controls that are currently being implemented, and whether such controls have effectively reduced the risk to human health and the environment from MEC hazards;
- State and DoD explosive ordnance disposal (EOD) response agreements, database tracking and incident reporting; and
- State/Federal Coordination on IRM controls (e.g., State review and comment on proposed IRM controls and State involvement in implementing IRM controls).

For States, ASTSWMO requested detailed information on IRM controls and IRM elements implemented at MRSs nationwide. Although ASTSWMO requested similar information from federal agencies, they were not asked to provide site-specific IRM control information as were the States. DoD Military Components – U.S. Air Force, U.S. Army and Army Corps of Engineers (USACE), and U.S. Navy – provided information to ASTSWMO.

This report provides an analysis of the State and DoD responses to ASTSWMO's requests including whether the State and federal data support the MRF paper's recommendations for the development and implementation of a national IRM framework. This report does not include education or policy information on the MMRP in general, unless it is necessary for a specific section of the report. For further information on the MMRP, visit:

- *ASTSWMO State Munitions Resource Guide*, June 2008
  http://www.astswmo.org/Files/Policies_and_Publications/Federal_Facilities/Final%20State%20Munitions%20Resource%20Guide%20070908.pdf

- DoD MMRP Homepage:
  http://www.denix.osd.mil/mmrp/

- U.S. EPA Military Munitions Homepage:
  http://www.epa.gov/fedfac/documents/munitions.htm

II. OVERVIEW OF THE MMRP

A. Scope of MMRP

The *Fiscal Year (FY) 2010 Defense Environmental Programs Annual Report to Congress* (DoD Annual Report) reports that the annual budget for the MMRP – Active, Formerly Used Defense

Sites (FUDS), and Base Realignment and Closure (BRAC) programs – was approximately $420 million. The report also provided that DoD's estimated cost to completion for MMRP cleanup was $15.2 billion in FY 2010, which includes $10 billion for FUDS, $4.4 billion for Active, and $0.8 billion for BRAC.

The DoD Annual Report identifies 4,482 munitions response sites (MRSs) within the MMRP. Of these 4,482 MRSs, there are 2,375 identified as MRSs with "Study Underway" (preliminary assessment (PA), site investigation (SI), or remedial investigation (RI)/feasibility study (FS)) and 52 identified as MRSs with "Study Planned" (FY 2011 or later). In other words, DoD has not initiated response actions at 2,427 MRSs (approximately 54%).[2] State information provided to ASTSWMO suggests that the majority of MRSs (approximately 85% in the "Study Underway" phase) have IRM controls or elements being implemented.

Of particular concern are the MRSs located on FUDS property and are now privately owned (including State or municipal ownership). These publicly or privately owned MRSs, which are often available for public use, may be currently used or developed for uses that are incompatible with the potential presence of MEC. In the DoD Annual Report, there are 1,703 FUDS MRSs in DoD's MRS inventory.

B. Interim Risk Management in the Munitions Response Process

IRM is an important part of both the federal and States' munitions response process. The following figure illustrates the CERCLA remediation process and the phase of risk management appropriate for each CERCLA activity at MRSs. The risk management phases include:

- Notification and Disclosure of areas with potential MEC hazards
- Developing and implementing an IRM Plan to manage risk to public exposure at each property until cleanup occurs
- Replacing the IRM Plan with a Long-Term Stewardship Plan to address residual risks after cleanup

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[2] The Focus Group observed minor discrepancies between the number of MRSs identified by States in their responses to ASTSWMO and those identified by DoD in the FY 2010 Annual Report to Congress. This could be due to States' interpretation or definition of MRS.

Figure 1. Phases of Risk Management during Munitions Response Process [CO DPHE]

The figure below illustrates the two primary components for MEC risk – hazards and exposure. Risks can be managed by reducing the explosive hazard through removal actions, and/or reducing exposure by management of site use and/or users.
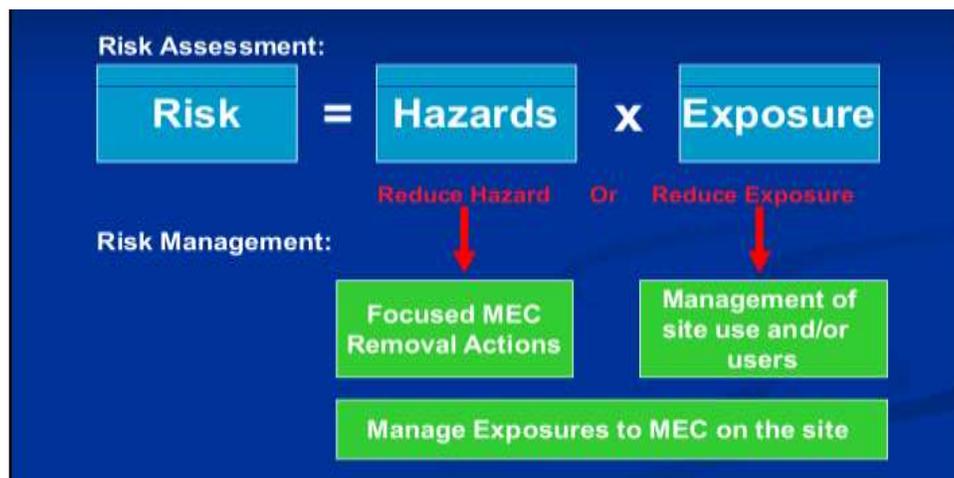
Figure 2: MEC Risk Assessment vs. Risk Management [CO DPHE]

III.   ANALYSIS OF RESPONSES

The focus of this paper is on reduction of exposure through the management of site use or users, and not on reduction of actual hazards (e.g., time-critical removal actions (TCRA)). Table 1 identifies the wide range of IRM controls and elements that have been identified for potential implementation in an IRM plan. Selection and implementation may be based on the type of MRSs (identified below) and site conditions.

Thirty-one (31) States and three DoD Military Components – U.S. Army/USACE, U.S. Navy and U.S. Air Force – provided information in response to ASTSWMO's information requests. This report has been organized so that State and DoD responses to the same or similar questions are organized and analyzed under the same subsections (A-G):

   A. IRM Policies and Guidance

B. Tracking of MRS Cleanups
C. Examples of IRM Controls
D. Effectiveness of IRM Controls
E. State EOD Response Agreements, Database Tracking, and Incident Reporting
F. State/Federal Coordination
G. Additional IRM Information

In some cases the subsections below include percentages or real numbers "of States." When this data is used, it refers only to the percentage or number of States that submitted information to ASTSWMO for that specific subject area and not to all 50 States, 5 Territories, and the District of Columbia. Although 31 States and three DoD Military Components participated, some did not answer every question in ASTSWMO's information request. The information requested from States and specific quantitative data and narrative information submitted to ASTSWMO by the States are provided in Appendix A to this report. Each subsection heading below (A-G) is hyperlinked to the data and narratives for that subject area found in Appendix A.

Table 1: Types of MRS and IRM Controls and Elements

Types of MRS[1]	Types of IRM Controls and Elements
• Former Range • Former Munitions Treatment Unit (e.g., Open Burning/Open Demolition) • Former Practice Munitions Range • Former Maneuver Area • Former burial pit or other disposal area • Former industrial operating facilities • Former firing points • Former missile or air defense artillery emplacements • Former storage or transfer points • Former small arms ranges	**Institutional controls** • Deed notices • Deed restrictions/Notations in Master Plan (for active installations) • Digging Permits • Notification of property owners and public officials **Physical controls** • Fencing • Signage • Ground cover • Controlled burns **Other Risk Management Elements** • Explosives or munitions emergency response support • Community Education and Outreach about Explosive Safety • Construction support • Tracking and Analysis of Munitions Related Incidents

[1] 32 CFR Part 179, Munitions Response Site Prioritization Protocol Final Rule

A. IRM Policies and Guidance

A large majority of States (81% of those responding) are not aware of any DoD-wide or DoD Military Component-specific IRM policies or guidance for MRS. DoD Military Components

indicated that munitions risk management guidance is provided within existing documents, including the FY 2002 U.S. Air Force memorandum on the standup of the MMRP, NAVSEA OP5 – *Ammunition and Explosives Safety Ashore*, and various U.S. Army pamphlets.

Guidance and policy discussed in the response appears to only apply to sites under direct control by the respective DoD Military Component. It is unclear to what extent the guidance documents require IRM. The Navy states that IRM activities under environmental restoration are not mandated by policy, but rather established on a site-by-site basis in consultation with State regulators, among others. The U.S. Army indicated that it is assisting the Office of Undersecretary of Defense (OSD) in drafting DoD-wide policy for IRM.

Subsequent to conducting this information request, on May 21, 2013, DoD issued Instruction No. 4715.07 concerning the Defense Environmental Restoration Program (DERP). This instruction included a brief policy statement and definition for implementing IRM activities, where appropriate, to reduce potentially significant threats to human health at a site where DoD is not expected to conduct an investigation, removal action, or remedial action for an extended period of time. It further instructs that IRM activities be coordinated with various parties including environmental regulators and property owners. The statement also mentions that IRM activities be reviewed and adjusted, as appropriate, if new information becomes available. The DoD Instruction is available at:
http://www.dtic.mil/whs/directives/corres/pdf/471507p.pdf

B. **Tracking of MRS Cleanups**

ASTSWMO asked States and DoD to explain how they track MRSs during the extended period between completion of the investigation phase and commencement of the response action phase.

State Responses:

Of the 30 States that responded to this question, 15 indicated that MRSs are typically tracked through their project managers, while 7 specifically mention an electronic filing system or database. Five (5) additional States mentioned both a database and project managers. Three (3) States either do not require tracking or do not have MRSs in the IRM phase. Based on these responses, virtually all States that have ongoing munitions response activities track the progress of MRS cleanups.

DoD Responses:

DoD indicated that they track sites throughout the CERCLA process. However, DoD Military Components have different management systems for tracking MRS cleanups. The U.S. Army tracks sites throughout the CERCLA process in all restoration programs. Once designated as a MRS, information is retained in databases indefinitely. The U.S. Navy develops long term

schedules for each MRS and response phase through achievement of response complete or Site Closure.

The majority of MRSs within the U.S. Air Force MMRP are just now completing the SI phase and moving into the RI phase. The U.S. Air Force, in general, at both active installations and BRAC installations, has not had an "extended period between completion of the SI/RI phase and commencement of the response action."

Conclusion:

Both States and DoD appear to track MRSs throughout the cleanup process and coordinate activities, when required. In addition, the U.S. EPA tracks MRSs through its CERCLIS database and the Department of Interior is developing a Military Legacy Sites (MLS) database to track MRSs using the data from the USACE's Formerly Used Defense Site Management Information System (FUDSMIS) and the U.S. Army National Guard.[3] However, after the analysis of the responses, it remains unclear whether or not, and how, IRM controls are specifically tracked throughout this process.

C. Examples of IRM Controls

The Focus Group asked States to provide examples of IRM controls currently employed by DoD. As listed in Table 1, examples of IRM controls were classified into three categories:

- Physical controls (e.g., fencing);
- Institutional Controls (e.g., deed notices); and
- Other risk management elements (e.g., construction support).

In addition, the Focus Group requested that States specify the types of MRSs (e.g., ranges) and the phases of cleanup (e.g., PA/SI) for the specific control listed.   DoD Military Components were not asked to provide detailed information regarding various MRSs and IRMs controls being implemented.

State Responses:

The top controls and tools implemented at MRSs, as reported by States, are provided in Table 2 below. Notification and deed restrictions (institutional controls); signage and fencing (physical controls); and community education and emergency response support (other risk management elements) are the most common controls and tools implemented throughout the CERCLA cleanup process.

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[3] U.S. EPA and the Department of Interior provided this information subsequent to ASTSWMO's original request for information.

Table 2: Risk Management Elements Most Frequently Implemented Based on State Responses

	PA/SI	Ongoing RI	RI Complete	TCRA and Non-TCRA
Institutional Controls	Notification (17) Deed Restriction (8)	Notification (15) Deed Restriction (12)	Notification (12) Deed Restriction (10)	Notification (16) Deed Restriction (10)
Physical Controls	Signage (14) Fencing (11)	Signage (16) Fencing (15)	Signage (13) Fencing (8)	Signage (11) Fencing (9)
Other Risk Management Elements	Community Education (15) Emergency Response Support (12)	Community Education (15) Emergency Response Support (15)	Community Education (10) Construction Support (10)	Community Education (14) Emergency Response Support (11)

(#) = Number of States reporting utilization of controls out of a total of 30 respondents.

According to the State respondents, munitions disposal (e.g., open burning and open detonation (OB/OD)) sites, and ranges, including rifle and small arms ammunition[4] (SAA) ranges, are the MRS locations most likely to have controls and risk management elements implemented by DoD. States identified a wide range of IRM controls employed at these MRSs, as well as during the various CERCLA cleanup phases. With respect to ranges and SAA ranges, IRM controls are distributed across all three major categories - physical, institutional, and other risk management controls. At munitions disposal sites, physical controls are the most frequently implemented category of controls.

DoD Responses:

MRSs can be grouped into two categories: (1) MRSs no longer under DoD control (FUDS and BRAC transferred properties); and, (2) MRSs at active military facilities that have former operational ranges.

According to the U.S. Army, controls common to all installations and programs are placement of signage and distribution of educational materials (e.g., 3Rs - Recognize, Retreat, and Report). At FUDS, the U.S. Army listed property owner notification as a third potential IRM control. The U.S. Army will consider the use of fencing and land use controls to limit access at BRAC installations and active installations, while administrative controls (e.g., placing areas off limits) can also be used at active installations.

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[4] Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.

It is evident that the U.S. Army's range of options for IRM is proportional to the degree of control it has over the property where a MRS is located. The range of options is more limited at FUDS where USACE must secure right of entry from the property owner prior to any onsite activity. At the other end of the spectrum, the U.S. Army has comprehensive control over its active installations and can administratively close off sites where munitions present a risk.

The U.S. Navy provided information on specific IRM controls it has implemented at various types of MRSs at BRAC and active installations. At BRAC installations, the U.S. Navy has employed the following IRM controls: [5]

- Disposal area: annual munitions sweeps, educational pamphlet/video
- Open burn/open detonation area: removal action
- Ranges: fencing/signs

At active installations, the selected IRM controls were:

- Disposal areas: signs/fencing
- Ranges: surface removal

The U.S. Air Force requests funding for projects if MMRP studies identify the need to restrict areas until a TCRA or non-TCRA can be evaluated. The U.S. Air Force added that if a situation at a MRS requires a TCRA, the U.S. Air Force would immediately program the funding required for such a response. IRM controls are not implemented at Air Force BRAC installations, as controls in place are considered permanent and not interim.

Conclusion:

The wide range of IRM controls employed at MRSs across the various DoD restoration programs and during the various CERCLA cleanup phases support both the States and DoD positions that IRM controls must be tailored to each situation and land use. DoD responses indicated that IRM controls are implemented on a site-specific basis and can vary according to type of restoration program, nature of risk, and type of MRS.

State responses both confirm and lessen some concerns introduced in the MRF Paper. The MRF specifically recommends that DoD increase the use of and improve training in construction support and controlled burns. Individual State responses confirm that use of construction support and controlled burns as controls are limited nationwide. DoD indicates that control burns may be used to support a munitions response removal action but should not be used as an IRM control.

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[5] The U.S. Navy listed removal actions and surface actions as a type of IRM control. These are not listed in 32 CFR Part 179 guidance as an IRM control.

The MRF Paper also recommends that DoD improve community outreach, emergency response, and property owner notification at MRSs, and include these activities in an IRM framework. ASTSWMO's research indicates that these activities are among the most frequently implemented types of institutional controls and risk management elements at MRSs nationwide. (Note: Property owner notification should not be confused with notification of State and local officials, which is discussed later in this report).

D. <u>Effectiveness of IRM Controls</u>

In addition to asking States and DoD for examples of IRM controls, the Focus Group requested States provide information on the effectiveness of IRM controls and elements in reducing exposure.

<u>State Responses:</u>

A majority of States that responded (20, approximately 68%) consider the IRM controls that are being implemented to be effective. An additional four States (approximately 14%) consider IRM controls to be both effective and not effective. The controls most frequently identified as effective are: fencing/barricades; signage; education/awareness training; and notice in master plans. Approximately 25% of States have concerns over IRM control effectiveness, with FUDS most often identified. Details are provided in Appendix A of this report.

<u>DoD Responses:</u>

DoD Military Components did not specifically comment on IRM effectiveness. However, the U.S. Army stated that MRSs under the direct control of the Army (e.g., active installations) allow for a greater range of IRM options with resulting higher IRM effectiveness.

<u>Conclusion:</u>

States and DoD both recognize that appropriate IRM controls, when properly implemented, can provide substantial reduction in risk to human health and the environment.

As 25% of States identified concerns with the effectiveness of IRM controls and elements, there could be a large number of MRSs, particularly at FUDS, where IRM controls are not effective in reducing exposure. The effectiveness concerns at FUDS likely reflect the limited IRM options available as these properties are not under DoD's control. However, a number of States provided examples of effective controls at FUDS, which indicates there is potential for improving the effectiveness of IRM controls at FUDS. These examples are provided in Appendix A.

E. State EOD Response Agreements, Database Tracking, and Incident Reporting

ASTSWMO requested that States and DoD provide information regarding munitions related emergency response agreements and whether these agreements require EOD incident notification to States. Information was also sought on database tracking of munitions related incidents. It is important to note that EOD responses can occur at both known MRSs and at other locations.

State Responses:

The majority of States (69%) do not have or are not aware of agreements with local police and emergency responders for EOD support of an explosives or munitions emergency (EOD response). Of these States, information concerning EOD responses is reported if the response occurs on a MRS, a FUDS, or for some other reason. Of the 31% of States that reported having agreements with local police and emergency responders, all indicated there is a requirement to notify the States. Notification requirements range from notification of all incidents, notification for specific actions (e.g., a detonation permit), or notification only if the incident occurred on a MRS or FUDS.

Regarding database tracking of EOD responses, 69% of States indicated that they do not know if local police and emergency responders maintain a database to track those incidents. With respect to State database tracking, 14% of States are aware that the State tracks EOD responses reported by local police and emergency responders. In addition, 44% of States reported that the State tracks all EOD responses if reported to local police and emergency responders.

The majority of States (66%) do not have State-wide agreements with DoD Military Components to provide EOD response support, while 34% indicated they do have such agreements. For those States with State-wide agreements for EOD response support, 50% (5 States) noted that there is a requirement to notify the State.[6] For those States without notification requirements, whether or not they have an EOD response agreement, the methods by which a State receives notification can vary. For example, one State is notified when an EOD response occurs at a RCRA-permitted facility, while another State has obtained information accidentally through newspapers or second-hand reports. Some States also reported receiving notification in installation-specific agreements and may be notified of incidents as part of these agreements. Two States indicated that they are notified of all incidents.

Regarding DoD tracking of EOD responses, 67% of States responded they do not know if DoD maintains such a database. With respect to State database tracking, 45% of States indicated that they track EOD responses if reported.

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[6] Information was not requested as to who is responsible for notifying the State.

DoD Responses:

The U.S. Army, U.S. Air Force, and U.S. Navy provide EOD responses at active and BRAC facilities under its jurisdiction, generally through the closest geographically located EOD unit. DoD Military Components each have localized agreements to provide EOD support at various MRSs. Some U.S. Army and U.S. Air Force EOD units have memorandums of agreement (MOAs) or memorandums of understanding (MOUs) with local law enforcement, municipalities, and/or States for general EOD response; there are no agreements for general programs (e.g., BRAC) or specific sites. The U.S. Navy also conducts an EOD response in support of local and State (e.g., police and bomb squads) agencies, and federal agencies, if requested.

Each DoD Military Component has differing notification requirements when an EOD response is conducted. The U.S. Army does not notify the State environmental agency when an EOD response is provided, as States and local law enforcement agencies typically request the support. If a State requires the U.S. Army to provide formal notification, the U.S. Army recommends that the State establish a process for obtaining notification from local and State law enforcement agencies. The U.S. Navy typically enters into MOUs with local, State, and/or federal agencies within an EOD unit's geographic responsibility. MOUs generally outline authorities regarding emergency response support, roles and responsibilities of civil and military agencies, and the appropriate regulatory authorities. Any required formal notification would be stated in the MOU. The U.S. Air Force is required by its own policy to notify States and local agencies of EOD responses.

DoD maintains a centralized, internal database on all EOD operations, including emergency response support to non-DoD entities and wartime operations. Reports from local or State bomb squads, which are not provided to DoD, are not included. Information is not publically accessible; however, if a State requires information about a specific incident, it may contact the U.S. Army munitions-related points of contact.

Conclusions:

The MRF Paper recommends that a consistent process for notifying State officials of EOD responses be developed in a national IRM framework. State responses indicate that this notification is inconsistent among DoD programs, and within/among States. A majority of States provided that they do not have EOD agreements with local police, emergency responders, or the DoD Military Components. Since DoD indicated EOD response MOAs and MOUs may be with either local law enforcement, municipalities, or States, there are likely EOD agreements between federal and local agencies that States are not aware of. Irrespective of whether such agreements are in place, responses indicate there is no standardized reporting process for EOD responses. This can potentially lead to an underreporting of munitions incidents at FUDS unless DoD and other stakeholders take measures to ensure local agencies and private individuals know what to do and how to report to DoD if munitions are encountered.

Database tracking of EOD responses varies from State to State with many reporting that they do not maintain a database of EOD responses. The MRF Paper recommends the creation of a centralized database open to all public officials (federal, State, local). DoD indicated that it maintains a centralized EOD response database. However, that database only tracks incidents that occur on DoD property or involve DoD personnel as responders, and does not track reports from local or State bomb squads. The database is not available to State and local officials.

F.   State/Federal Coordination

The Focus Group asked States to provide information on their level of involvement and coordination with federal agencies in the implementation of IRM planning and activities at MRSs.

State Responses:

A majority of States (approximately 52%) indicated that they are not involved in the implementation of IRM controls. However, approximately 83% of State respondents indicated they have the opportunity to review and comment on proposed IRM controls prior to their implementation. This is usually performed during review of the work plans and reports provided under the CERCLA/RCRA/State regulatory process.

A majority of States (approximately 61%) have requested that IRM controls be implemented where none existed. Some of these requests have been denied. The two most common responses for DoD rejecting State requests for IRM controls is (1) the MMRP does not allow for implementing IRM controls at the initial phases of the CERCLA process, and (2) implementation costs. A small percentage of States (10%) indicated that delays in investigation and response actions could occur due to the costs of implementing IRM controls. Similarly, a small percentage of States (13%) provided examples where IRM implementation costs have been used by DoD to justify delays in conducting additional investigations and response actions.

DoD Responses:

All three DoD Military Components indicated it is standard practice to provide States the opportunity to review and concur on IRM controls. DoD Military Components have not declined to implement State recommended IRM controls at MRSs under DoD control; however, FUDS have been identified by States as examples of MRSs where IRM controls have been declined. With regards to declination of State requests, the Army considers implementation of IRM at FUDS to be a shared responsibility between Army, the property owner, and the State. The Army added that it cannot implement most IRM measures at these sites without the consent of property owners.

All of the DoD Military Components indicated that they have sufficient funding to implement IRM controls. For sites under DoD control, it appears that each DoD Military Component budgets for IRM controls as part of the overall CERCLA process. The USACE indicated that it works with the U.S. Army each year to determine allocations for IRM activities in the annual

FUDS budget.

Conclusions:

Although many States indicate they are not involved in implementing IRM controls, generally, States have been provided the opportunity to review and comment on proposed IRM controls. States have also had success when requesting that DoD implement IRM controls at MRSs under DoD control. In cases where DoD declines a State's request to implement IRM controls, reasons cited by States and DoD vary: States cite implementation costs and DoD's position that IRM controls are not appropriate during the current phase of the MMRP process; DoD indicates that requests for IRM controls are denied mainly due to lack of site access and control of the MRS.

IRM implementation costs do not appear to be a major factor in delaying additional response actions. However, implementation costs could impact the FUDS program given the high number of FUDS currently without any IRM controls. Based on the current funding level of the MMRP and DoD's cost-to-complete estimates, a high percentage of MRSs may remain in the Study phase for the foreseeable future.

G. Additional Interim Risk Management Information

ASTSWMO requested that States and DoD provide any additional information they consider relevant to implementing IRM controls at MRSs.

State Issues/Recommendations:

- One State reported concerns with the long term tracking on the effectiveness of the institutional controls.
- One State recommended the implementation of a GIS-based system that could be accessed by the State to document where EOD responses have been reported.
- One State requested a need for USACE to be more proactive in its handling of FUDS MRSs.
- Multiple States recommended that ASTSWMO and States work with the DoD Military Components to issue clear policy about responsibility and risk management while these sites are being investigated.
- One State reported difficulty implementing IRM controls at FUDS since DoD no longer owns the property. Land owners are reluctant to agree to IRMs due to the cost to implement them and fears regarding land devaluation.

DoD Responses:

- U.S. Navy reported that IRM activities are generally not major considerations for BRAC installations considering the push to accelerate environmental cleanup to meet relatively near-term goals for property transfer and RC in FY 2018 and 2021.

IV.   RECOMMENDATIONS

The information provided by States and DoD confirm that appropriate IRM controls, when properly implemented, can effectively reduce the risk to human health and the environment. The findings presented in this paper also confirm State concerns regarding the need to implement IRM controls at a large number of MRSs that presently have none. In general, the findings of this paper indicate:

1) A lack of State awareness of DoD IRM guidance and implementation procedures;
2) Inconsistent tracking and reporting of EOD responses between DoD, local emergency responders, and States; and,
3) State-identified concerns with IRM effectiveness.

It is the State Federal Coordination Focus Group's intent that the findings and recommendations of this paper aid States and DoD in implementing IRM controls at MRSs, as well as assist in the development of the national IRM framework. The Focus Group offers the following recommendations:

- For FUDS:
  - Increase the use of IRM controls due to the long period of time between investigation and response action and the fact that these sites are no longer under the control of DoD; and
  - Continue the State- and national-level FUDS Forum Working Group to develop procedures for overcoming current challenges to implementing IRM controls (e.g., coordination with property owners).

- DoD should give States an opportunity to review and comment on the forthcoming DoD policies and supplemental USACE guidance on IRM at MRSs, which should include identifying State roles and responsibilities in IRM implementation. The Focus Group supports DoD's efforts to establish a nationwide initiative for conducting IRM activities, which would be a major advancement toward developing and implementing a national IRM framework as recommended by the MRF paper and ASTSWMO.

- Any forthcoming DoD policies and guidance should recommend that DoD Military Components and States schedule local meetings concerning IRM activities (e.g., review of current controls, planning for IRM control implementation where appropriate, etc.), and, where applicable, apply the hazard assessment methodology as per the *Munitions and Explosives of Concern Hazard Assessment Methodology (MEC HA), Interim Final, October 2008.* State and DoD responses support the MRF paper recommendation that a coordinated effort among all the stakeholders (DoD Military Components, State and local governments, property owners, etc.) will facilitate implementation of the most suitable risk management controls based on site specific factors.

- Where not in place, paper agreements should be established between States and the DoD Military Components, as well as between States and civilian/military responders for EOD responses. Such agreements should include clearly defined duties for each of the parties involved, including EOD reporting and other information sharing. This was also recognized in the MRF paper.

- A national centralized database should be established for consistent tracking and reporting of EOD responses, which should be accessible by federal, State, and local officials. The database could be maintained by either DoD or the State law enforcement agency, with a requirement for EOD responses to be reported. Consideration should be given to also recording and tracking responses by civilian authorities (e.g., bomb squads). This was also recognized in the MRF paper. Holistic tracking of EOD responses will allow analysis to determine whether such responses suggest, over time, trends that may indicate the existence of a potentially unknown munitions site. In addition, any trends determined by this data could be used to determine whether an existing MRS requires either re-prioritization or re-sequencing for munitions response actions.

- Future discussions between States and DoD Military Components should include a clarification of MRS definitions (e.g., site vs. installation vs. property) and a review of currently identified MRSs for consistent planning purposes and project management.

- State responses support the importance of continuing to incorporate public explosives safety education as part of any IRM program at MRS sites.

- States that reported concerns with IRM control effectiveness should contact their respective DoD Military Components for prompt resolution.

APPENDIX A: STATE RESPONSES TO INFORMATION REQUEST

A. Overview

In 2012, the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) State Federal Coordination Focus Group contacted all 50 States, five Territories, and the District of Columbia (States) to gather information concerning the extent to which interim risk management (IRM) controls are being implemented at munitions responses sites (MRSs). This Appendix provides the specific questions the Focus Group asked States, the data received and analyzed by the Focus Group, and summarizes potential data limitations. Specific State and site names, contact, and other identifying information are not provided. This appendix is organized to follow the organization in the ASTSWMO IRM Report and does not follow the order of questions in the original State information request.   Questions from the information request are referenced throughout the appendix.

B. Data Limitations

The Focus Group identified potential data quality anomalies upon analyzing the information received from States. Misunderstanding of the questions and multiple definitions among States for specific terms are examples that may lead to limitations in using some data.   Items identified include:

- **State Question 2** requested number of MRSs in the State. The total of number of MRSs reported by States differed from those provided by in the *FY 2010 Defense Environmental Restoration Annual Report to Congress* (Department of Defense (DoD) Annual Report). State and DoD discrepancies in the total number of MRSs is most likely the result of a State reporting an entire property or installation as one MRS whereas the DoD reports individual MRSs within a property or installation.

- **State Question 9e** requested information on State involvement in implementing IRM controls at MRSs. It appears that several States have interpreted this question to include review and concurrence on proposed IRM controls, which was requested in Question 4**.** As a result, the 48% of States that responded "Yes" to Question 9e may be a slight over representation of States that actually participate in the implementation of IRM controls.

- **State Question 10** requested information on how States track MRSs during the period of time between the completion of the site investigation (SI) phase to the start of a response action.   The Focus Group's intent was to collect information from States on how they track IRM controls at these sites but in hindsight the request for that information is not clear. Although a high percentage of States (and all DoD Military Components in their responses) provided information on how they track MRSs, it cannot be ascertained if and how this tracking applied to IRM controls.

- **State Question 12** requested information on State emergency response agreements with local police and emergency responders. This was a yes/no question and, therefore, may under report the actual number of agreements that are in place due to instances where the State is unaware such agreements.

- **State Question 13b** requested information on State emergency response agreements with the DoD Military Components and incident notification requirements. There may have been some confusion by the States as to whether this question pertained to EOD responses associated with a particular federal facility or a military component/geographical region.

- **State Question 14/ DoD Question 3a** requested information concerning munitions and explosives of concern (MEC) accidents over the past 10 years. Since there is no standardized reporting process of such incidents ASTSWMO does not believe the data is sufficient to develop findings/conclusions. Nevertheless, the information provided by States has been included in this Appendix.

C. **Scope of MMRP**

Question 1:   Please provide contact information for the person in your State most familiar with the MMRP and who could answer any follow up questions the Focus Group may have.

Thirty-one States (55.6% of all States) responded to the Focus Group's request for information, representing all 10 U.S. Environmental Protection Agency (EPA) regions.
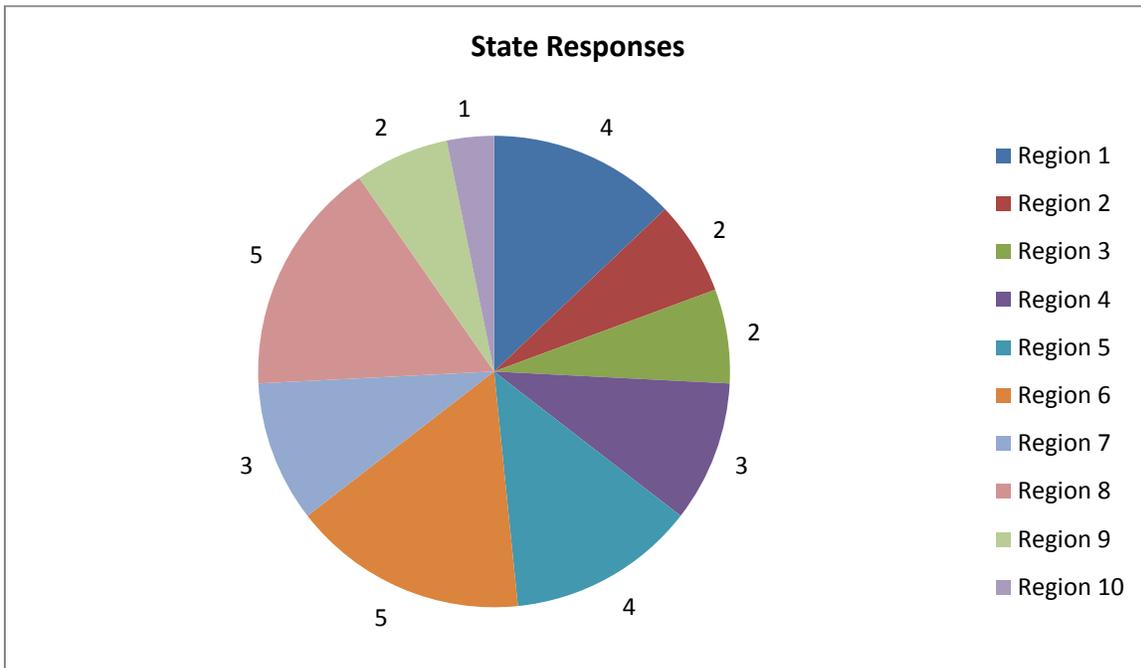
Question 2:   Information about federal facilities in your State with MRSs:

a. Number of properties, including FUDS, with MRSs in your State:

***b. Number of properties, including FUDS, that have completed the PA/SI phase but have not
initiated final response actions for MEC: (NOTE: Only include those sites recommended
for further investigation. Do not include sites recommended for no further action which
have had State concurrence.):***

The Focus Group requested this information to understand the scope of the Military Munitions
Response Program (MMRP) (Question 2a) and to determine the approximate number of sites
that qualified for IRM, if appropriate (Question 2b). Subsequent to receiving information from
States, the Focus Group collected extensive data from the DoD Annual Report for comparison
purposes.

The DoD Annual Report provides information for total number of MRSs by State, DoD
restoration program, and cleanup phase. The DoD Annual Report does not provide a data
summary for the total number of MRSs between the preliminary assessment (PA)/SI phase and
initiation of final response action, which States were asked to provide. The closest categories of
sites in the DoD Annual Report are "Number of Sites with Study Underway – MMRP" and
"Number of Sites with Study Planned."   According to DoD, "Study" comprises three
investigation phases: PA, SI, and remedial investigation/feasibility study (RI/FS). These
categories of sites are used for comparison purposes below.[7]

In response to ASTSWMO's request, 31 States reported a total of 2,368 MRSs. Of that total, the
States reported that 1,275 MRSs (approximately 53.8%) have completed the PA/SI phase but have
not initiated response actions and qualify for IRM activities. For the same 31 States, the DoD
Annual Report lists a total of 3,237 MRSs, with 1,713 MRSs (54.2%) in the "Study Underway"
and "Study Planned" phases. These 1,753 MRSs would qualify for IRM activities. Figure 1
compares the information provided by States to the data in the DoD Annual Report.

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[7] Nationwide, the DoD Annual Report lists a total of 4,481 MRSs with 2,427 MRSs (54.2%) in the "Study Underway"
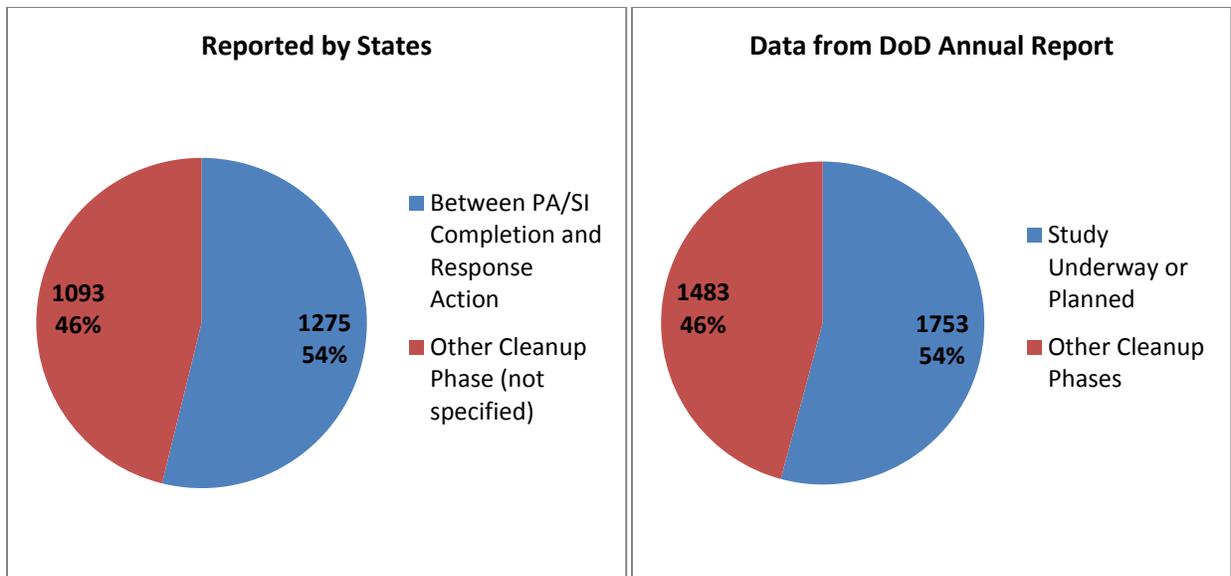and "Study Planned" phases.

Figure 1: Total MRSs in 31 Participating States

Question 3: *For the MRSs included in the response to Question 2 above, how many have implemented IRM controls? Examples of MRSs and types of IRM controls include:*

Types of MRS[1]	*Types of IRM Controls and Elements*
• *Former Range* • *Former Munitions Treatment Unit (e.g., Open Burning/Open Demolition)* • *Former Practice Munitions Range* • *Former Maneuver Area* • *Former burial pit or other disposal area* • *Former industrial operating facilities* • *Former firing points* • *Former missile or air defense artillery emplacements* • *Former storage or transfer points* • *Former small arms ranges*	**_Institutional controls_** • *Deed notices* • *Deed restrictions/Notations in Master Plan (for active installations)* • *Digging Permits* • *Notification of property owners and public officials* **_Physical controls_** • *Fencing* • *Signage* • *Ground cover* • *Controlled burns* **_Other Risk Management Elements_** • *Explosives or munitions emergency response support* • *Community Education and Outreach about Explosive Safety* • *Construction support* • *Tracking and Analysis of Munitions Related Incidents*

Figure 2: Total MRSs with IRM Controls or Elements (31 State Responses)

D. IRM Policies and Guidance

Question 8: IRM Policies and Guidance:
a. Are you aware of any IRM policies or guidance that DoD and/or the military components have for MRS? Yes, No, or Do Not Know.

b. If there is such policies or guidance, does it apply to MRSs at all phases of investigation/response action, including the PA/SI phase? Yes, No, or Do Not Know.

Please explain your responses to the questions above, if applicable.

Figure 3: State Awareness of IRM Policies and Guidance

Additional Information provided by States:

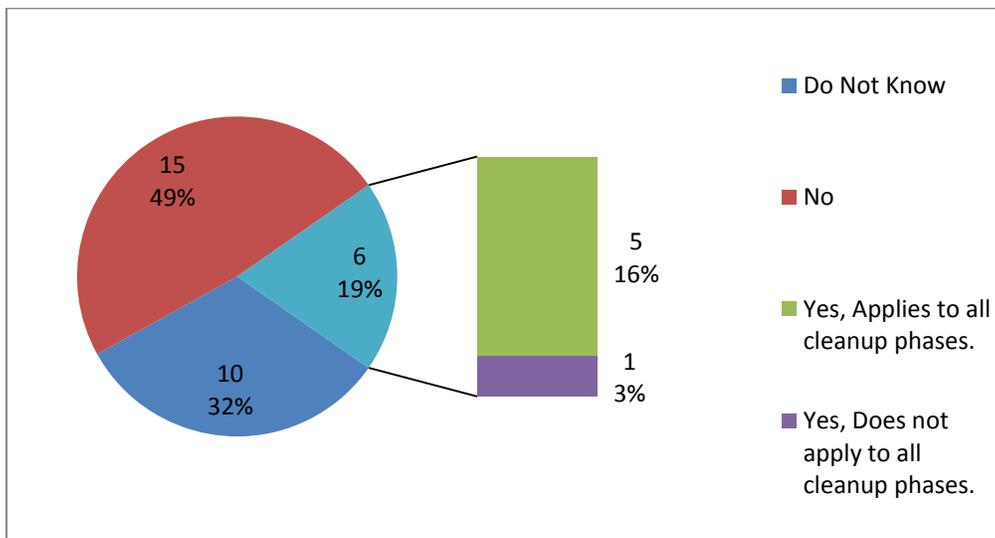- EP 75-1-2 identifies when construction support and other unexploded ordnance (UXO) support are required for investigation and construction activities.
- IRM could potentially be applied at any phase of response action.
- Any IRM control should be implemented based on the potential risk and policies should apply to all phases based on the risk at that stage of the process.
- DoD Military Components have provided guidance documents to the State.
- Imminent threat situations have specific protocols required for holding, guarding and blow in place events. Most policies on IRM deal with these situations.
- U.S. Army Corps of Engineers (USACE) indicates that Headquarters has a new policy that restricts IRM including prohibiting use of MMRP funds for construction support. However, we have never seen this in writing.
- If there is guidance available, the State would like to know where to access this.
- We recently learned that the Formerly Used Defense Sites (FUDS) will be implementing an IRM control program that will include guidance on IRM for FUDS. At the time of this response the guidance has not been released by the USACE.

E. **Tracking of MRS Cleanups**

Question 10: Explain how your State will track MRSs during the extended period between completion of the SI/RI phase and commencement of the response action phase.

Thirty (30) States provided examples of how it tracks or will plan to track MRSs between the SI/RI phase and start of response actions:

- We have a database of our MRSs that tracks what was done at the site and what our position was on any remedial actions conducted by the U.S. Army.
- We work cooperatively with DoD to ensure that all stakeholders are informed of the progress of site investigations and/or remediation. Typically, there are quarterly meetings held between the State and DoD to make certain that all work plans are approved and field work is commenced in a timely manner. Also, the regulators are responsible for updating an electronic filing system that keeps all documentation filed chronologically for these purposes.
- USACE keeps State apprised of all documents and planned activities at MRSs. A State representative attends site meetings and site visits when appropriate to stay up to date of FUDS in the State.
- State uses the Enviro-stor and Geotracker databases.
- IRM controls are tracked by the Project manager as part of each project. The IRM Plan for each site addresses the monitoring strategy and the level of tracking and reporting appropriate for each specific MRS/facility.
- Project managers will maintain records.
- As of right now there is only one so it is relatively easy to track. USACE is not working on it at all.
- For active installations, project manager includes tracking of IRM controls in their project

oversight. For FUDS, due to the age of the World War II era ranges that will go to RI and the lack of incidents in the decades since their transfer to private ownership, it is not expected that they will present imminent danger.

- For most MRSs that are still under study, we expect that the response actions will consist of administrative documentation of the actions in our electronic filing system. There are very few sites for which active remediation such as a removal action has been deemed necessary. There is at least one major FUDS at which we do not expect the RI phase to be initiated for years. We do not have anything specifically set up to indicate what is needed at this site.

- We have site management plans that the developer has to follow and military needs to check on and also have grant of environmental covenants to provide the highest degree of deed restriction.

- POC and contact reporting.

- In general communication with the potentially responsible party (PRP) and DoD.

- USACE and its contractor are taking the lead and the State is actively involved with the Defense State Memorandum of Agreement (DSMOA) and MMRP programs participating in technical document review and other planning and concurrence/stakeholder activities. The State maintains copies of work plans, reports, and other technical planning and decision documents on a site-specific basis within our records management filing system.

- The Resource Conservation and Recovery Act (RCRA) permitted facilities are tracked through the permits and by RCRAINFO. FUDS are required to have a five year review.

- If the MRSs are on a site tracked in the State's public database of contaminated sites (which includes federal and State Superfund sites, brownfield sites, RCRA sites, etc.) information about the interim risk management controls will be included in the public database under the existing institutional control (IC)/environmental covenant (EC) heading.

- Active project management. Site activities are not moving slow.

- We keep a spreadsheet.

- With the limited number of MRSs in the State we have manually tracked them as usually there was only a 12-18 month time period between completion of the SI/RI phase and the completion of the response action phase, if required.

- The individual project managers track the schedules for these sites and contact the DoD Military Component Remedial Project Manager (RPM) if deliverables are not submitted to see why the schedule has been delayed. They also would respond to any inquires by stakeholders if they had questions about why the controls are needed. At active installations, they would also ensure that any land use control (LUC) plans or PMPs are in place and effective.

- Through frequent contact with USACE who implement the investigation work in State.

- Sites are entered into our database.

- We track the progress through our RCRA permitting process and the Federal Facilities Agreement (FFA). For FUDS we track them through our Management Action Plan (MAP).

- Inclusion of the site in the State environmental database.

- For FUDS we will track these sites in the MAP. We are in the process of preparing the MAP with the USACE and EPA Region. State will also track MMRP sites for all DoD facilities in its database.

- DSMOA Joint Execution Plan (JEP).

- Internal tracking and coordination with DoD. No shared master tracking list or formal memorandum of understanding (MOU).
- State database is updated annually. MAP for FUDS is updated quarterly
- Currently we do not have any MRSs (pending commencement of response action) that have IRM controls.
- We have none to track.
- No plan as of this time.

F.   Examples of IRM Controls

Question 5:   Please provide up to three examples of where physical controls (i.e. fencing, signage, etc.) have been used for IRM at MRSs in your State, indicating the type of MRS in your response.

Twenty-eight (28) States provided 73 examples of MRSs and physical IRM controls. Figure 4 provides a compilation of the examples received, categorized by type of MRS. Those IRM controls classified as "Other" in Figure 4 include the following:

- Former Range (5 examples): security patrol (3), information booth (1), digging permit (1)
- Former Munitions Treatment Unit (1 example): rerouting pedestrian path
- Former Industrial Operating Facility (1 example): deed restriction
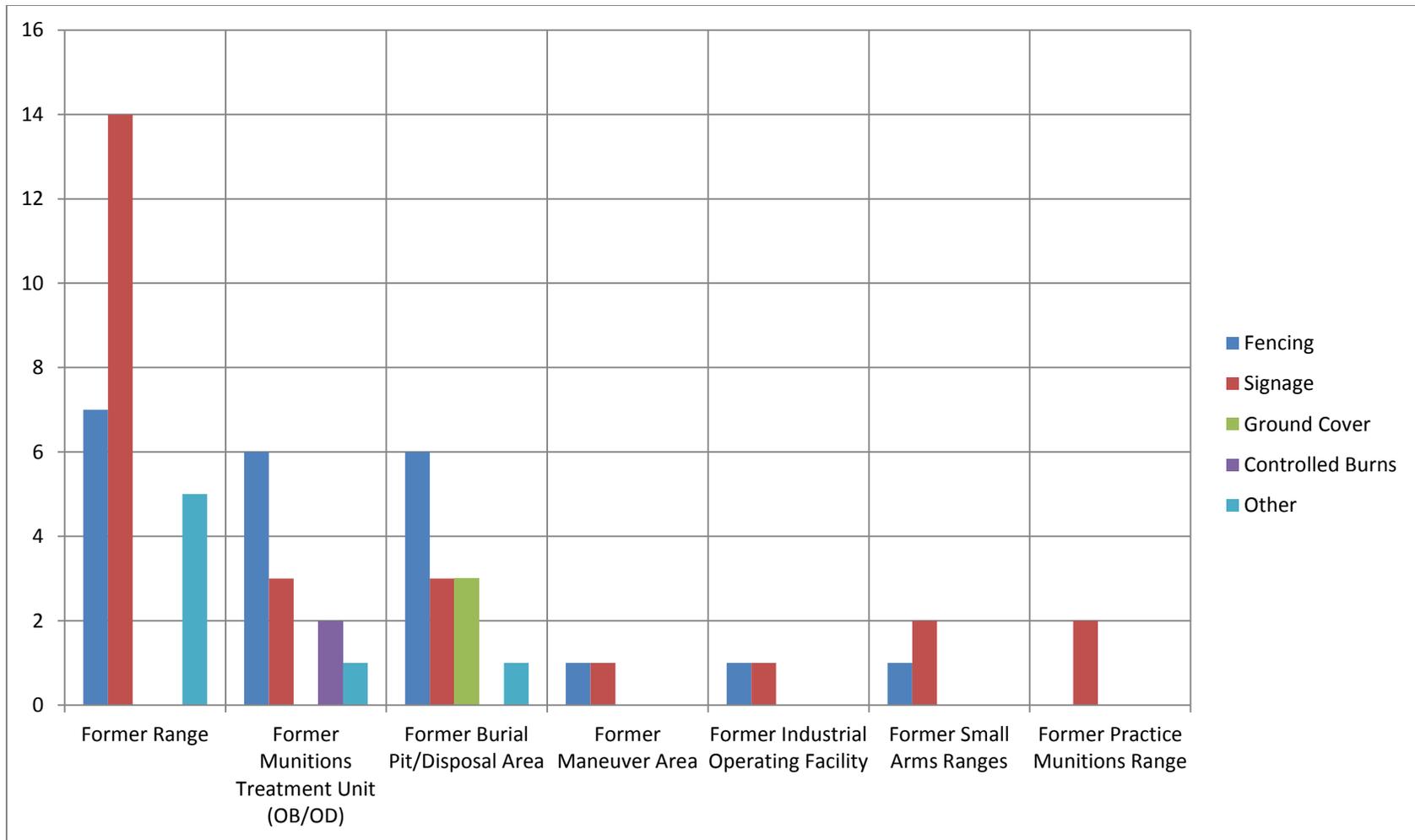
Figure 5: Examples of Physical IRM Controls Implemented in 28 States

Not included in Figure 5 are 13 examples that do not specify a type of MRS:

- FUDS (3 examples): signage (2), fencing (1)
- Base Realignment and Closure (BRAC) (3 examples): signage (1), fencing (2)
- Active Installation (3 examples): signage (1), fencing (2)
- Various/All Sites (4 examples): signage (2), fencing (2)

Question 6: Please provide up to three examples of where other risk management elements (i.e. UXO construction support, community education, etc.) have been used for IRM at MRSs in your State, indicating the type of MRS in your response.

Twenty-two (22) States provided 64 examples of MRSs and risk management elements. Figure 5 provides a compilation of the examples received, categorized by type of MRS. Those elements classified as "Other" in Figure 6 include the following:

- Former Range (4 examples): training site workers (2), UXO clearance (2)
- Former Maneuver Area (1 example): training site workers
- Former Munitions Treatment Unit (OB/OD) (1 example): training site workers
- Former Practice Munitions Range (1 example): State police briefings
- Former Small Arms Ranges (2 examples): inspections (1), notification of property owners (1)

Not included in Figure 6 are 21 examples that do not specify a type of MRS:

- FUDS (6 examples): community education and outreach (5), construction support (1)
- All/Program-wide/Various (10 examples): community education and outreach (6), construction support (1), explosives or munitions emergency response support (1), deed restrictions (1)
- Active Installation (4 examples): construction support (2), Base Master Plan notation (1), avoidance geophysics (1)
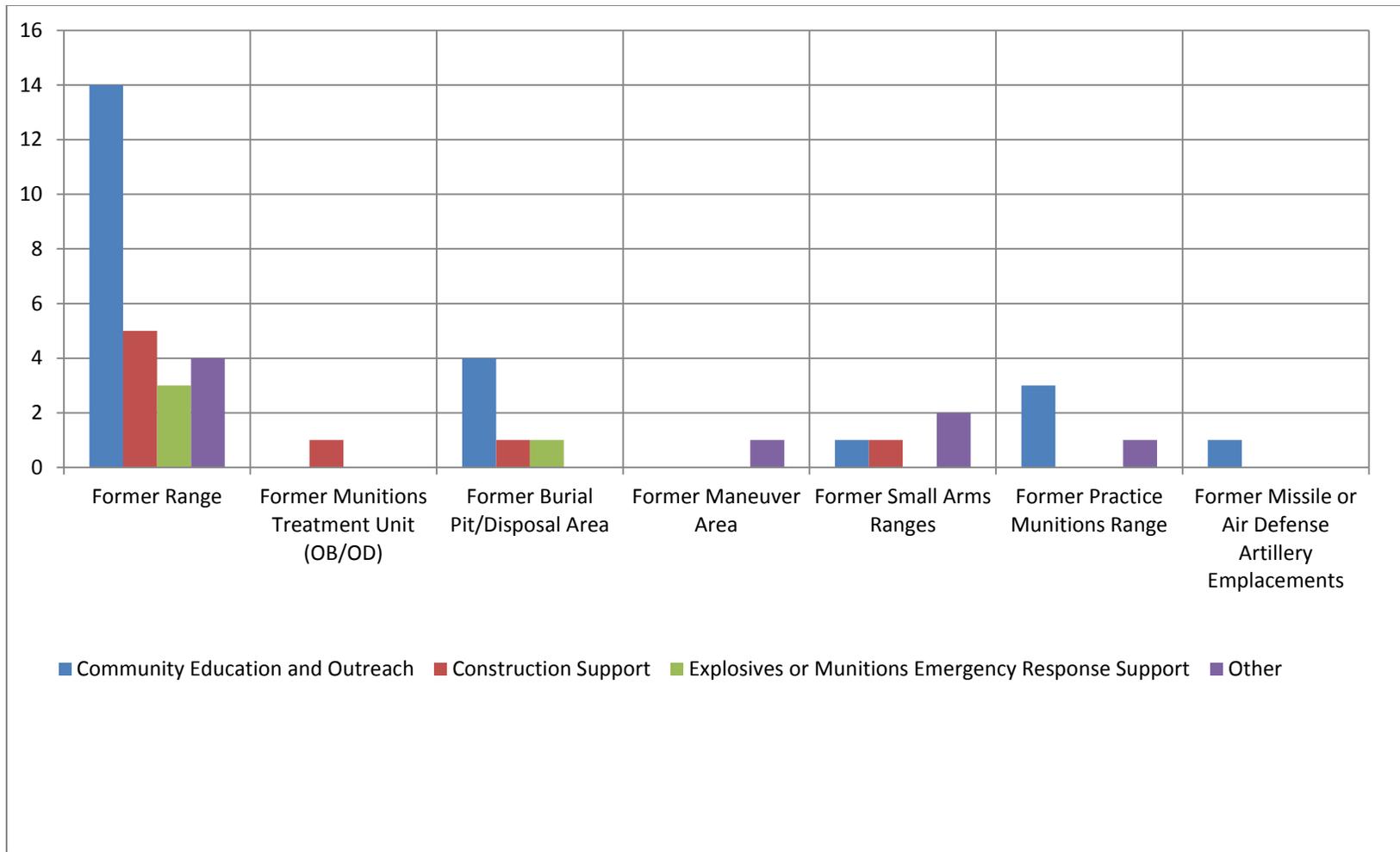- BRAC (1 example): community education and outreach

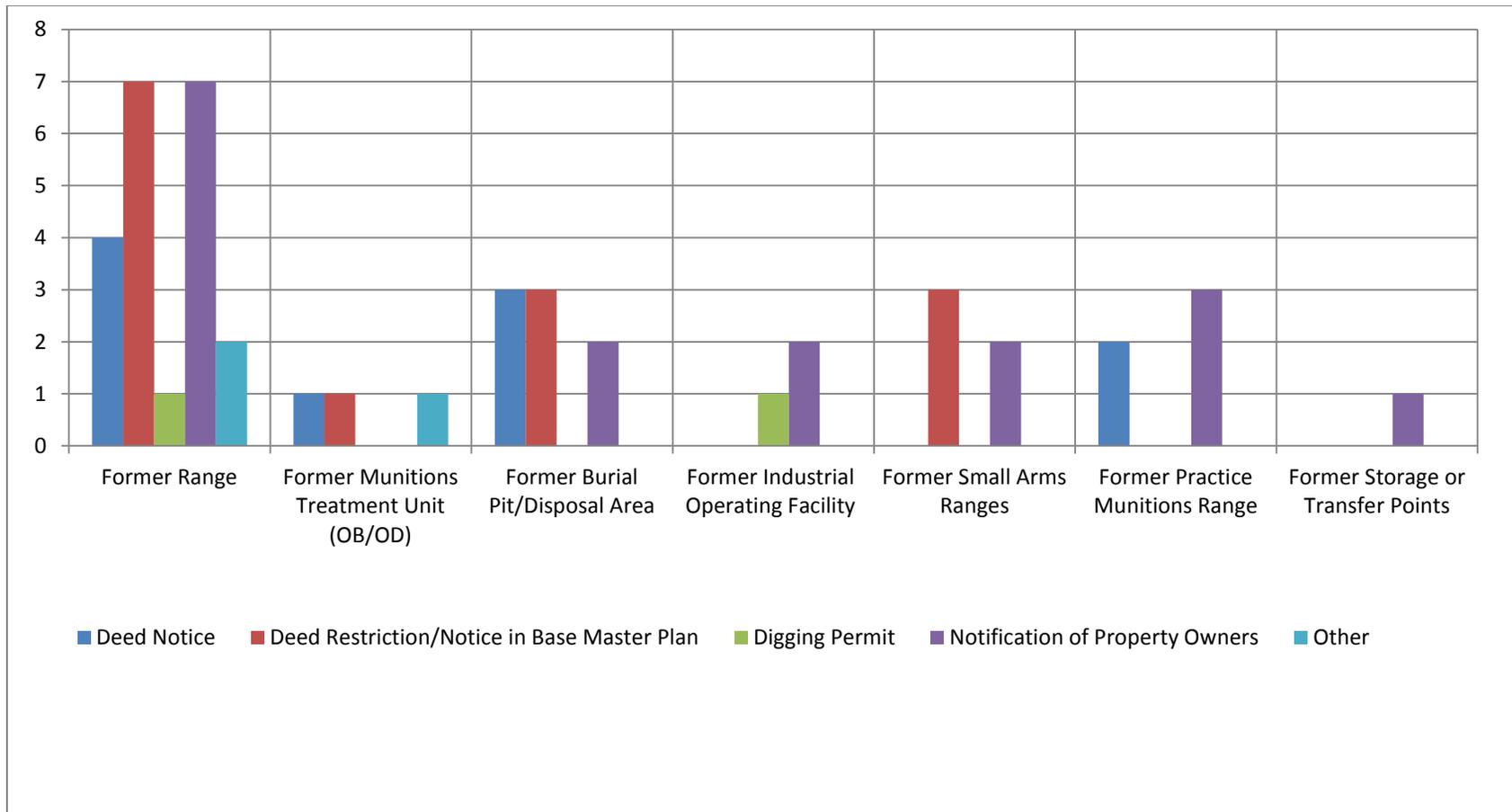**Figure 6: Examples of IRM Elements Implemented in 22 States**

Question 7:   Please provide up to three examples of where institutional controls (i.e. deed notices, notification of property owners, etc.) have been used for IRM at MRSs in your State, indicating the type of MRS in your response.

Twenty-three (23) States provided 58 examples of MRSs and institutional controls. Figure 6 provides a compilation of the examples received, categorized by type of MRS. Those institutional classified as "Other" in Figure 7 include the following:

- Former Range (2 examples): county sub-area plan (1), Miss Utility service (1)
- Former Munitions Treatment Area (1 example): site closure (1)

Not included in Figure 7 are 12 examples that do not specify a type of MRS:

- FUDS (4 examples): notification of property owners (2), create Wildlife Preservation Area (1), LUC (1)
- All/Program-wide/Various (3 examples): notification of property owners (2), deed restriction/notice in Base Master Plans (1)
- Active Installation (3 examples): deed restriction/notice in Base Master Plans (2), deed notice (1)
- BRAC (2 examples): deed restriction/notice in Base Master Plan (1), LUC (1)

Figure 7: Examples of Institutional Controls Implemented in 23 States

Question 8: For each phase of investigation listed below please indicate the types of IRM controls that have either been implemented or are planned for implementation.

Types of Institutional Controls (Check all that apply)

	Deed notices	Deed restrictions or Notations in Master Plan (for active installations)	Digging permits	Notification of property owners and public officials
PA/SI	[ ]	[ ]	[ ]	[ ]
Ongoing RI	[ ]	[ ]	[ ]	[ ]
RI Complete	[ ]	[ ]	[ ]	[ ]
TCRA or Non-TCRA	[ ]	[ ]	[ ]	[ ]

Types of Physical Controls (Check all that apply)

	Fencing	Signage	Ground cover	Controlled burns
PA/SI	[ ]	[ ]	[ ]	[ ]
Ongoing RI	[ ]	[ ]	[ ]	[ ]
RI Complete	[ ]	[ ]	[ ]	[ ]
TCRA or Non-TCRA	[ ]	[ ]	[ ]	[ ]

Other Risk Management Elements (Check all that apply)

	Explosives or munitions emergency response support	Community education and outreach	Construction support	Tracking and analysis of munitions related incidents
PA/SI	[ ]	[ ]	[ ]	[ ]
Ongoing RI	[ ]	[ ]	[ ]	[ ]
RI Complete	[ ]	[ ]	[ ]	[ ]
TCRA or Non-TCRA	[ ]	[ ]	[ ]	[ ]

Please provide any additional information you think is relevant to your responses above.

Twenty-seven (27) States provided responses to this question. Four (4) additional States indicated that IRM has not been implemented at MRSs in their States. Affirmative State responses are illustrated in Figure 8.
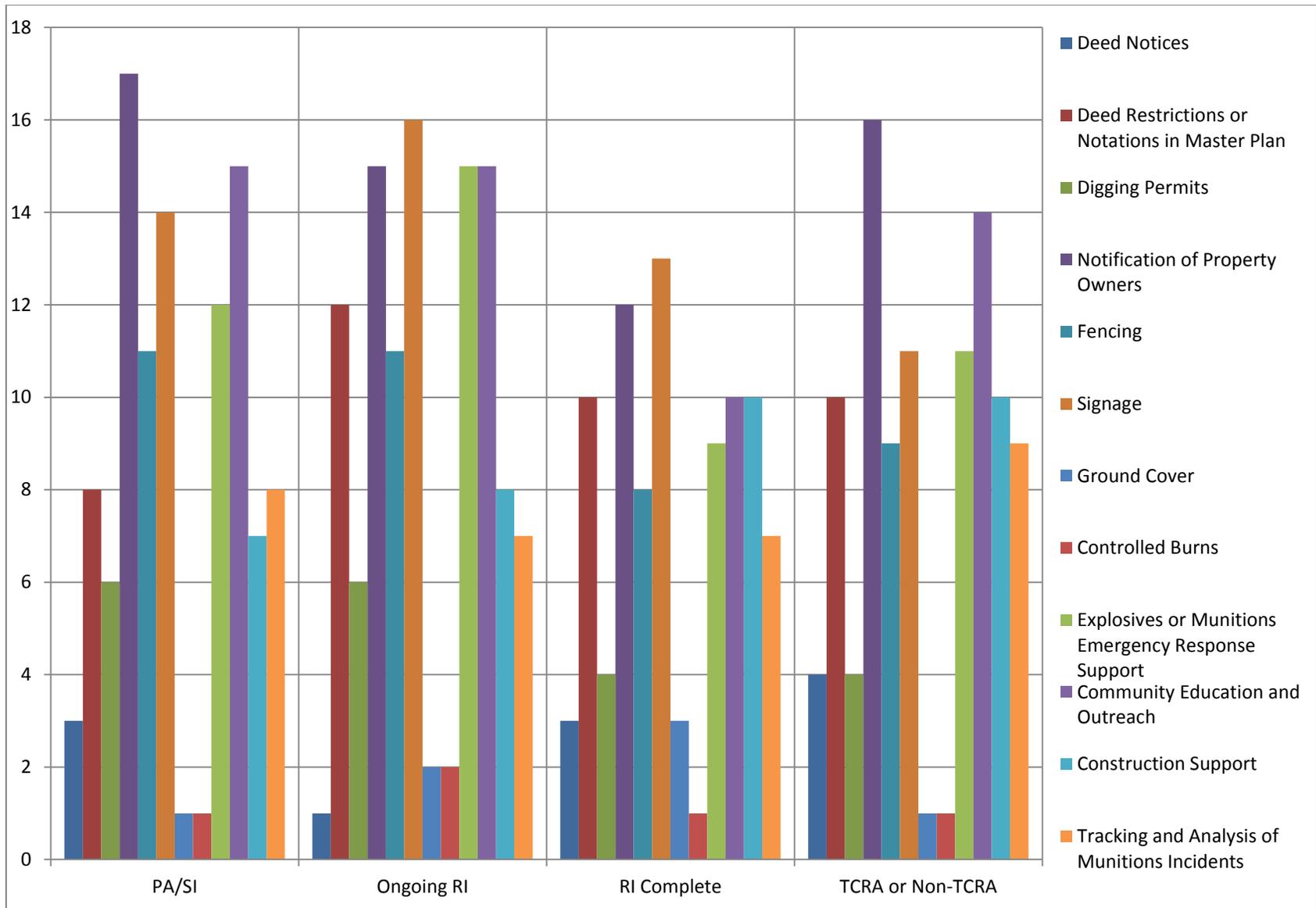
Figures 8: IRM Activities throughout the CERCLA Process (27 State Responses)

Nine (9) States provided additional information to this question:

- Explosives or munitions emergency response support is a State-wide issue. We have been working with the State Emergency Response Agency to ensure that explosives ordnance disposal (EOD) resources are available to respond to incidents of military munitions being encountered across the State. These efforts have been successful in establishing consistent procedures for requesting and receiving EOD response to munitions.
- For FUDS, USACE is very reluctant to fund community education and construction support.
- The State generally considers all IRM control tools for each MRS as early as possible with implementation until the controls have been shown to no longer be necessary to ensure protectiveness of the site. Every MRS is different and each requires an evaluation of the potentially exposed population, types of potential hazards and risks of exposure. Based on use of the site (which is generally known as soon as a site is identified) and general areas with concerns of potential for MEC exposure, an IRM Plan can be developed to identify the appropriate risk management tools to best manage site risks. One should not assume a generic set of controls would be appropriate or protective for a general category of MRSs. At the early stages of MMRP site management (i.e. PA/SI, RI/FS), IRMshould focus first on identifying site uses and controlling exposures. The specific types and locations of MEC hazards may not be known until much later in the process.
- Once the record of decision (ROD) is completed or the final document is prepared, the deed restriction is put in place before or at property transfer. An environment covenant is the selected restriction for MRSs.
- Access is restricted at active DoD and Department of Energy (DOE) facilities.
- The U.S. Army plans to implement 'Notifications in Master Plan' for 9 MRSs. USACE intends to implement public awareness efforts, signs, and fencing at 2 FUDS.
- The type of control implemented is based on hazard identified at site for the most part, and type and amount of MEC that has been found to date.
- For FUDS, the USACE conducts public meetings in accordance with CERCLA requirements. These meeting are intended to inform the public about project status and MEC hazards. These public meetings are not conducted on a regularly scheduled basis but are scheduled based on the project work schedule. Fencing has been used at two MRSs. Patrols are also conducted at one MRS.   For active installations MMRP sites are recorded in the Base Master Plan.

G. Effectiveness of IRM Controls

Question 4a. Does your State consider the IRM controls that have been implemented to be effective? Yes or No. Please explain below, indicating the type(s) of MRS, type(s) of IRM controls used, and controls you have found to be particularly effective.
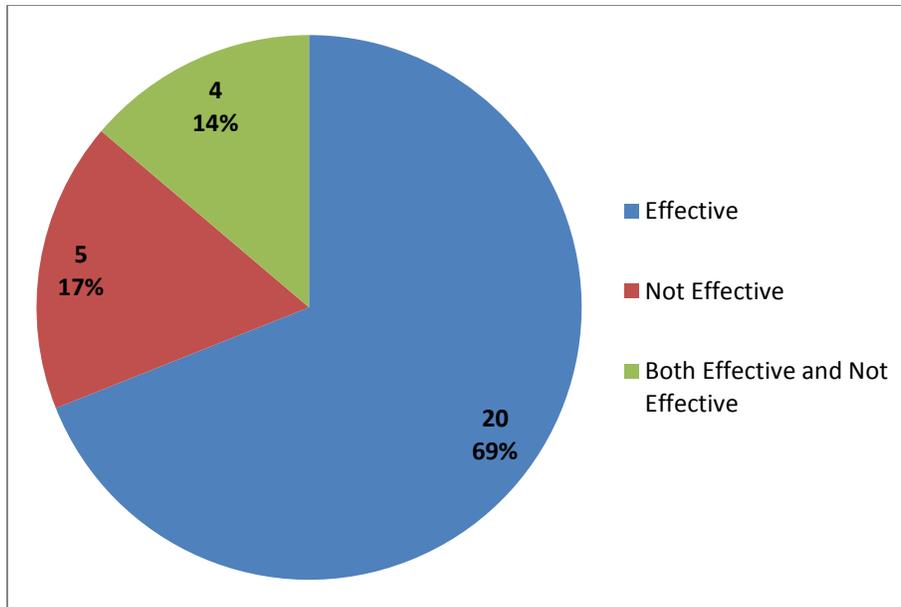
Figure 9: Effectiveness of IRM Controls (where implemented) (29 State Responses)

Additional Information from States finding IRM Controls "Effective":

- Overall, the State considers the IRM controls implemented to date to be generally effective. However, we currently do not have a good way to measure or quantify that effectiveness. We are working on ways to measure effectiveness. For now, we consider current controls to be better than nothing. The IRM controls at one property have been on-going since 1998 and include access and use restrictions (implemented voluntarily by land owners), signage, outreach/training and construction support (implemented by USACE). The construction support has been a very effective tool in managing exposure to MEC and allowing site uses to continue while cleanup is underway. For example, utility workers recently received hazard recognition training, USACE provided anomaly avoidance during well drilling and USACE responded to munitions debris found by the workers. At a FUDS the USACE provided construction support for U.S. Forest Service workers doing hazard tree removal as part of the IRM Plan. The USACE contractor inspected tree removal areas within MRSs for evidence of surface munitions hazards prior to tree cutting and removal. In addition, the USACE conducted visual inspections of the area surrounding each MEC incident to verify there were no additional surface MEC hazards in the immediate vicinity of prior incidents. At another facility, a new National Guard site, the National Guard provided warning signs, community, and school outreach and surface sweeps of trails as interim controls after a historic artillery range was recently discovered within a popular open space park adjacent to homes and schools. The IRM controls allowed the very popular park to safely remain open for public use while the PA/SI and eventual cleanup proceed. An Air Force base uses its Base Master Plan to provide IRM controls for MRSs including access restrictions and use controls. The Base Master Plan has been an effective tool for documenting and implementing IRM controls across the base. The Navy's program at one MRS is actively managed and works to keep visitors aware of ordnance hazards.

- Education, training, outreach events, inspections, and historical release type and exposures that don't warrant an emergency response or immediate action.
- The Navy's program is actively managed and works to keep visitors aware of ordnance hazards. USACE efforts to date typically include sign installation at remote FUDS during other field visits and some awareness training but these are usually onetime events that are not sustained.
- The BRAC and Active MRS sites have been remediated with removal actions followed by deed restrictions combined with dig smart plans or facility management plans. The FUDS found to pose the highest risk have been remediated with time critical removal actions (TCRAs) in areas where the highest amount of munitions items existed. The removal action are usually followed by community education, signage and fencing.
- The only site recommended for further action is a small arms range with lead contamination in soil. The lead concentrations exceed our direct exposure criteria, but do not warrant IRMs.
- FUDS: MRS type identified for future RI is mostly practice bombing ranges with one air gunnery range and a small arms range where disposal may have taken place. The property owners have been notified of the findings of the SI. There are no reported incidents with UXO at these sites. Active sites: These all have remedial actions completed or initiated. IRMs included signage, barricades, rerouting of pedestrian path.
- Munitions burial sites - deed notice for both; at one of these sites, signage has been in place for years.
- Dig permits, notification in Base Master Plans.
- The fencing surrounding the Former Burning Ground has been an effective control to keep trespassers off the property. Also, community education/outreach and notifications to property owners have been effective in keeping people from picking up and handling/keeping ordnance items. After educating the public, people have more much more likely to call their local police department if they come across an item rather than keeping it as a souvenir. Education and outreach on regular basis, with a CD provided to homeowners for future reference for property owners, site inspections, and site management plan.
- Still in the implementation phase with signage, deed notices, tracking, POC contact discovery information, education and awareness, inspections, etc..
- All four sites on active facility are under controlled access by site security.
- Fencing, signage, controlled burns, notification of property owners, notations in Base Master Plan, and digging permits.
- (6) MMRPs-ICs/ Master Plan; (1) FUDS-ICs/Master Plan.
- For active installations where issues are known or other properties still in the control of the federal government, controls included in the Base Master Plan have been particularly effective. The facility is able to maintain control over who enters the installation, MEC contaminated areas, and what types of activities occur in those areas.
- Artillery ranges, anti-aircraft ranges, rocket launcher, antitank, live grenade, machine and sub-machine gun ranges, bombing ranges, air to ground gunnery ranges, and small arms ranges. Effective controls include limiting access (fencing and signage), educational

brochures and educational signs, newsletters, and modifications to the Base Master Plan for an active AFB.

- Access controls and education programs.
- IRM's have been implemented at active DoD installations where safety is addressed in the Master Plan and site security is already in place. For FUDS that are owned by the State or federal government (i.e. State Wildlife Management Areas and federal park lands) where further action is recommended, warning signs are used and enforced by Park Police.
- Our MRSs are former small arms practice munitions ranges, former skeet range and one RCRA closed small OB/OD unit. The IRM controls have been fencing with signage which has been effective.
- Two Active Army Installations with multiple MRSs of varied types all controlled by installation land-use restrictions; two Active Air Force Installations with multiple MRS sites of varied types all controlled by installation land-use restrictions; one FUDS former artillery range with access restricted/closed by State entity land owner; one FUDS former bombing range with access restricted/closed by federal entity land owner.
- All active bases have digging permit requirements and MRSs (areas of concern (AOCs) or solid waste management units (SWMUs)) are identified on GIS layers and in the base master plans. Some bases have signage with contact information. The digging permit process has been an effective IRM control that eventually becomes part of the final remedy. During the investigation process the IRMs are constantly being monitored/ reported and improvements are made as necessary.

Additional Information from States finding IRM Controls both "Effective" and "Not Effective":
- The controls may be adequate but are untested over time and not tracked except at RCRA permitted facilities and one FUDS.
- The area is encased with 10-foot high, razor wire fence, so as long as no one cuts through it, the fence is effective.
- These are multiple MRSs over multiple properties. For the MRSs on active military ranges - the controls are the fencing and security patrols that keep individuals out, but they don't necessary prevent soldiers from encountering the MEC. For example, at one of our Air Force installations, they are just beginning the MRS process, and we have asked that the MRSs be included in the LUC plan for that installation to ensure that everyone was aware of what has been there in the past in case something is found in the future. At our Army installation, the PMP does a good job of keeping soldiers from encountering MEC but we do have violations of the PMP sometimes. At FUDS, most LUCs being implemented are at the sole discretion of the property owner, and some are effective, some are not. The education has been effective except where the locals are concerned it could impact tourism.
- We believe some to be effective and some ineffective. The deed restrictions placed on FUDS properties are known to be ineffective. Signage has been placed at a rifle range and we believe this action to be effective. At one large facility, some of the actions taken are believed to be effective. Here the Army has declined to place ICs on one parcel adjacent to

a demolition range. The Local Redevelopment Authority does not seem to want effective ICs on property transferred to them. They regard them as unnecessary.

Additional Information from States finding IRM Controls "Not Effective":

- The Army has installed fencing partially around the perimeter of a closed range. They have also installed signage, implemented road blockage, and conducts patrols. Trespassing continues to be a major problem. As a result the Army has an Engineering Evaluation/Cost Analysis (EE/CA) under way which when completed may propose implementation of additional interim land use controls (additional fencing around the range perimeter). The State is involved in the EE/CA process. At another facility the Army will be installing three strand barbed wire at the OB/OD area since this site is on federal property under Army control. During FUDS munitions public meetings the USACE uses these forums to notify/warn the public about potential hazards and to report any potential hazards to local authorities. Although the State cannot comment on the effectiveness of these public education activities we do support this effort by the USACE.

- Majority of the MRSs in the State use ICs to as a means to mitigate interim risk. It is extremely difficult as the State to enforce deed restrictions on privately owned property. There are situations in the State where property was transferred but the deed restrictions were not transferred with the property. DoD must find ways to enforce deed restrictions on FUDS in order to keep landowners informed of risks and hazards associated with MRSs. Hopefully the Uniform Environmental Covenant Act (UECA) will encourage DoD to adequately investigate and remediate MRSs to unrestricted used, thus eliminating the need for most ICs. Other IRMs like community education and outreach is extremely hard to implement in rural areas where private landowners do not understand the importance and urgency involving munitions and munitions debris.

- Many acres that were once part of a site was sold to a private owner(s) with deed restrictions shortly after World War II (surface use only). However, notice of these deed restrictions were not required as part of the deed for subsequent property owners. This is one example of many more that have probably occurred in the State.

- At the one site where there are controls, we have deed restrictions, public information meetings, annual institutional control inspections and the sites are included as part of a Miss Utility-like program. Only the program seems effective. The day after training of local first responders on UXO safety, one of the police officers from the training climbed down into a test pit and picked up a bomb. Excavation has been planned by DoD contractors and occurred without UXO safety technicians in areas that have been identified as possible UXO areas. Contractors have moved munitions material (turned out to not be live) during excavation without proper UXO support. At one other site a "no climb fence" had been built around a bombing range. The fence was not maintained after it was installed and parts fell down.

Question 12: Regarding emergency response agreements with local police and responders (non-military).

12a. Does your State have an agreement with local police and emergency responders regarding munitions emergency ordnance disposal (EOD)/response support? If yes, are they required to notify the State for each emergency incident?

9
31%

■ Yes, State Notification Required
■ No

20
69%
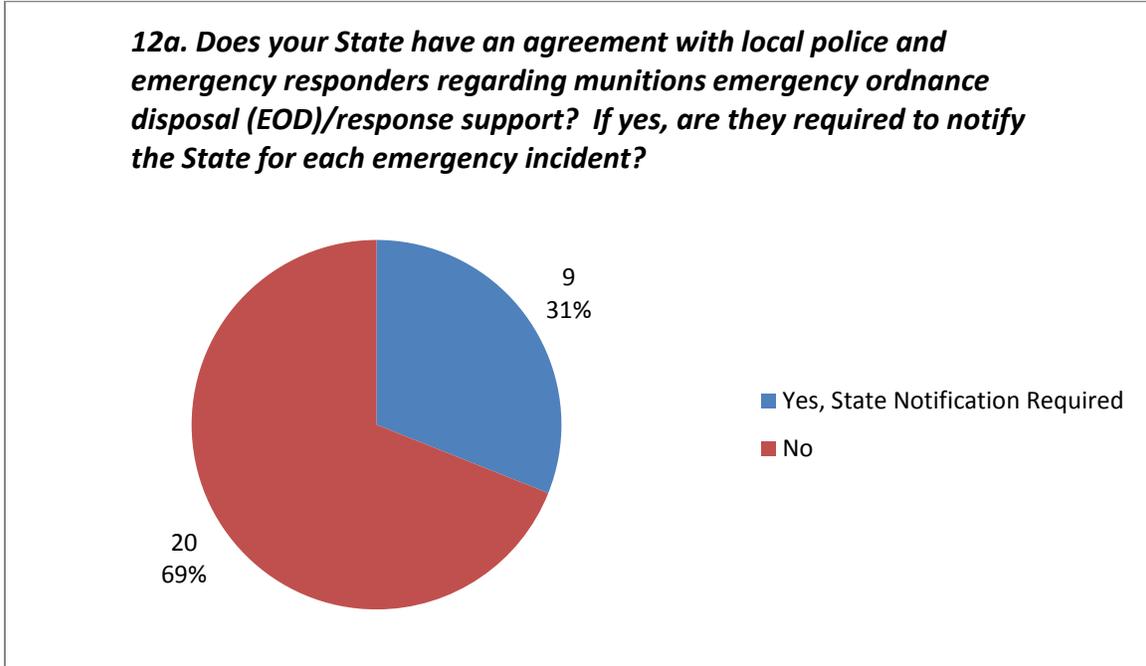
Figure 10: Agreements with Local Police and Emergency Responders (29 State Responses)

12b. Are you aware if the local police and emergency responders maintain a database of EOD incidents, and is this information available to the State?

4
14%

5
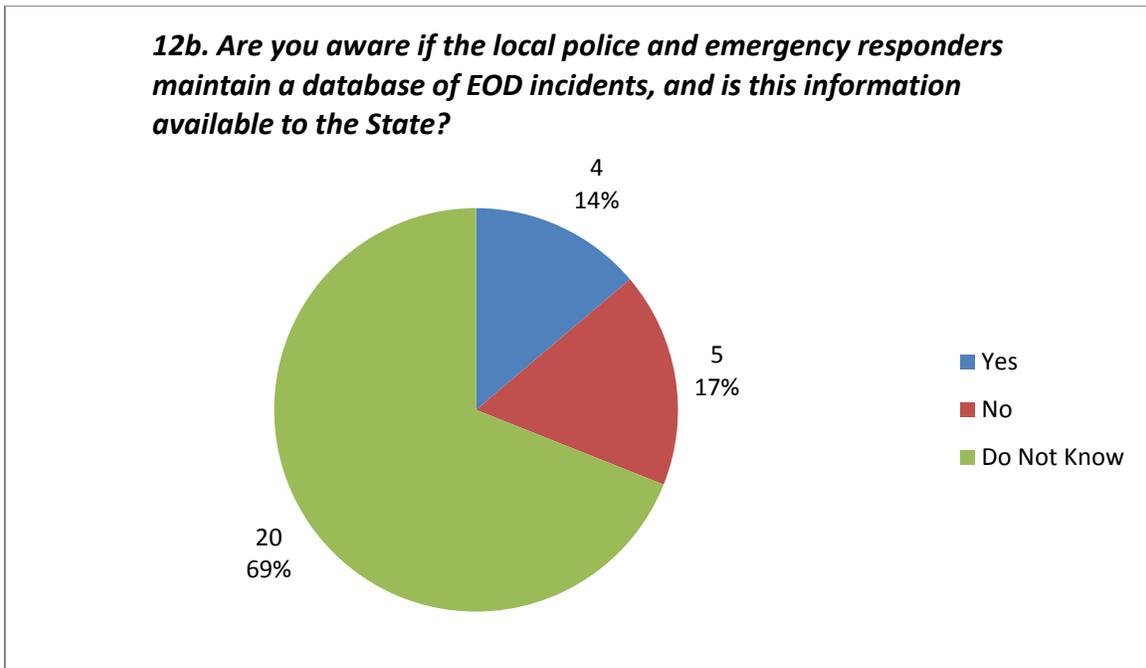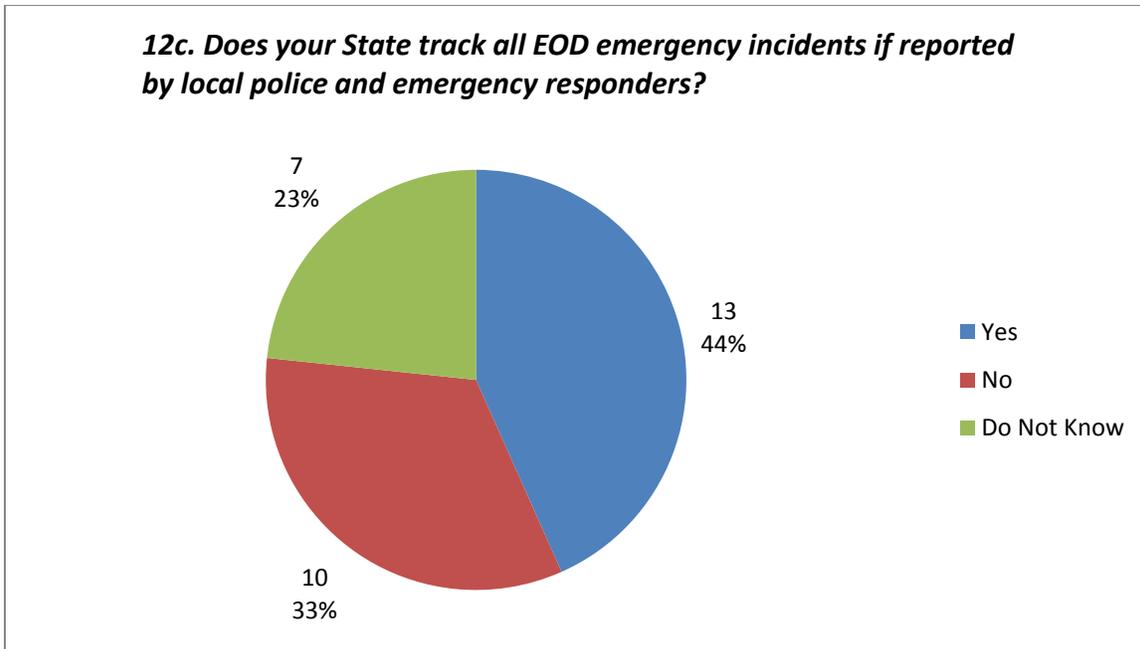17%

■ Yes
■ No
■ Do Not Know

20
69%

Figure 11: Local Police and Emergency Responders EOD Databases (29 State Responses)

Figure 12: Tracking Local Police EOD Incidents (30 State Responses)

Additional Information Provided by States:[8]

- Track if they are reported to our agency.
- Track if the incident occurred as a result of any investigation and/or remediation conducted on a MRSs or FUDS.
- We have established a system so that any community can report munitions finds and then request EOD response through the State police. This system has worked fairly well for several responses over the last two years. Difficulties in reporting to State and post response reporting from EOD still require additional coordination.
- State requires emergency permits for local, State and military EOD emergency response to military munitions. The emergency permits are tracked in a paper file.
- Our Office of Emergency Response receives notifications of all such incidents. They do not file EOD incidents separately, but they have records.
- The State does not have an agreement with responders as this is managed by USACE and its contractors. It also does not track incidents; however, the State EOC probably does.
- A local database is needed, especially for FUDS.
- We do not track. The State police keeps a log book of all calls. State police may have something internally they use for tracking as well.
- Other State agencies are responsible for maintaining any such databases that may exist.
- The State has Memorandum of Agreements (MOAs) with one city and the State Patrol. The State maintains a file of reported incidents. Typical incident would be a situation

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[8] "State" or "the State" in these responses refers to the State Environmental Protection Agency unless otherwise specified.

where a member of the public finds an item like an old hand grenade in a basement or fragments/components of ammo/military explosive device on a farm.

- Site is active installation and military units handle EOD emergencies.
- We have asked State Police Arson/Bomb and County Bomb Squads to let us know when an item may be from an MMRP site but we have no formal agreement on the matter. We would very much like to be notified of all incidents that may be related to our sites by State Squads.
- I am not aware of any formal agreements. One non-military responder agency does notify the State whenever they respond to a munitions response or disposal.
- It has been my experience that local police file police reports any time MEC is found and reported to them, and we can access these police reports thru public records requests. The only problem is if the police department involved does not file them separately than their other reports (e.g., they are listed by date) and someone has to go through them by hand to pull the MEC reports. Since some of the police reports are confidential (due to criminal cases) usually they have to provide the support.
- Bomb squad is part of Fire Marshall's Office which is part of State police. Local police call State police regarding explosives. For chemical issues the State Emergency Response Department is called.
- We track the notifications that come in through our emergency response line and we track the responses through notification from the EOD teams at the bases.
- All responsible parties are required to notify the National Response Center concerning spills and other emergency incidents. In turn the Center notifies the State of such incidents. The State maintains a database of such incidents which would include emergencies concerning military ordnance. Although the local police and emergency responders may not notify the State directly they are required to notify the National Response Center, which in turn will notify the State.
- Division of Solid and Hazardous Waste does issue an emergency detonation permit to allow emergency detonations of munitions.

Question 13: Regarding emergency response agreements with military services.

13a. Does your State have an agreement with military services regarding munitions emergency ordnance disposal (EOD)/response support? If yes, are they required to notify the State for each emergency incident?
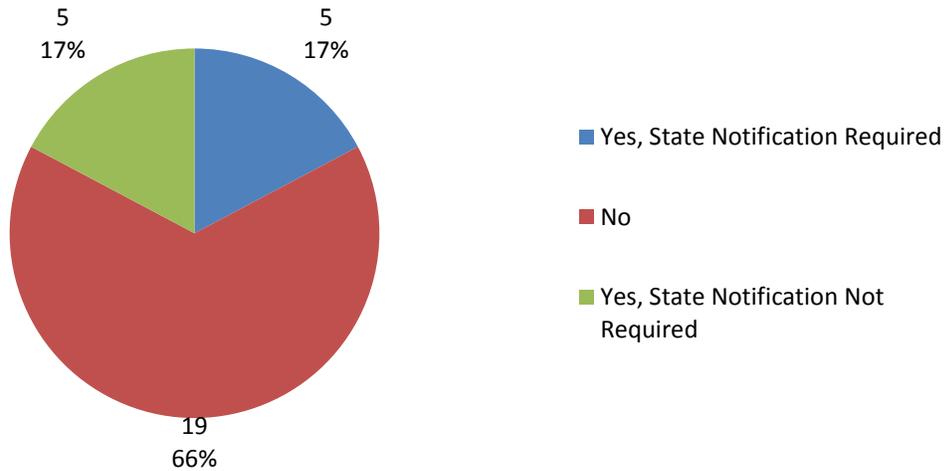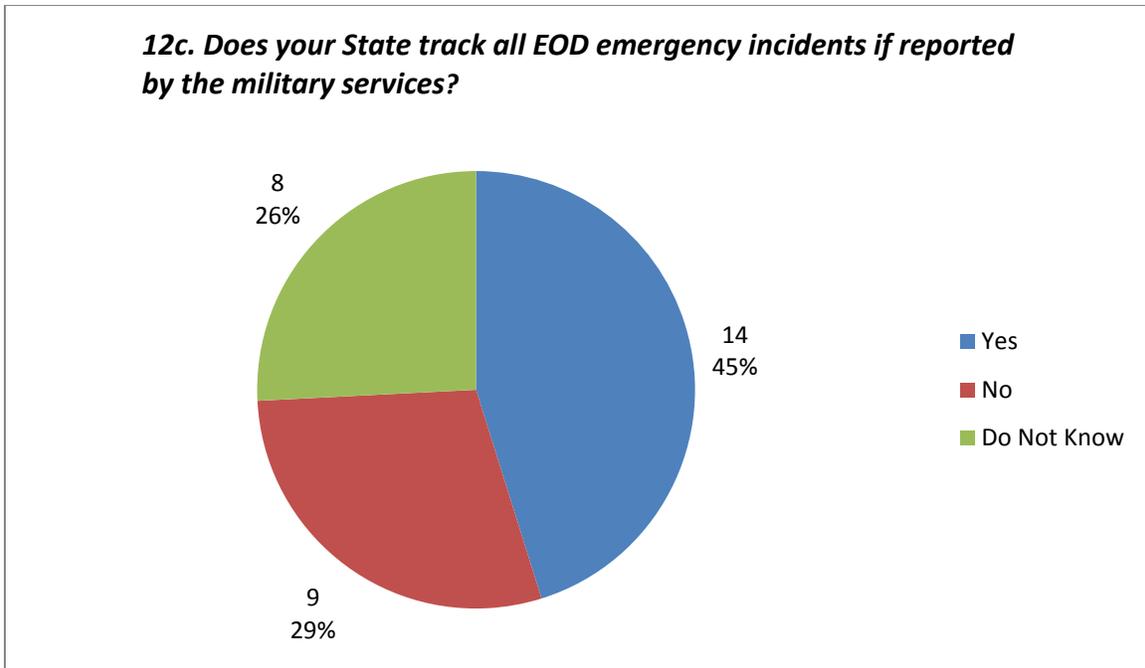

Figure 13: Agreements with DoD Military Services (29 State Responses)

13b. Are you aware if the military services maintain a database of EOD incidents, and is this information available to the State?
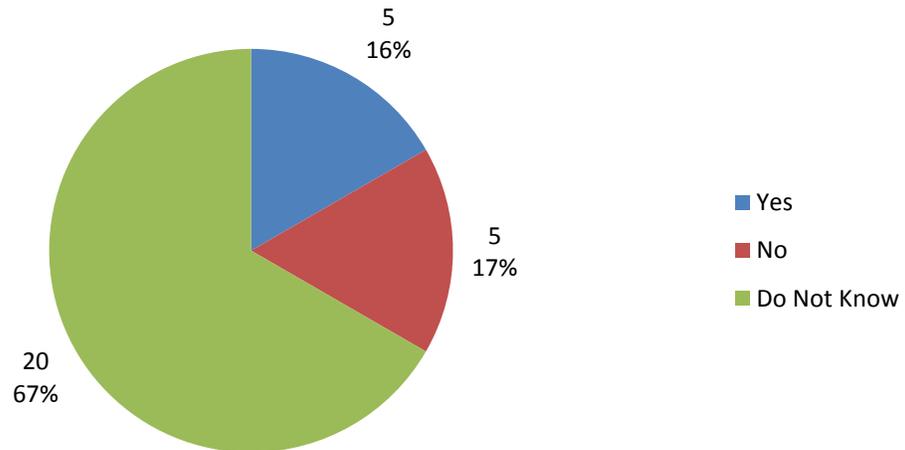
Figure 14: DoD Military Services EOD Databases (29 State Responses)

12c. Does your State track all EOD emergency incidents if reported by the military services?

Figure 15: Tracking DoD Military Services EOD Incidents (31 State Responses)
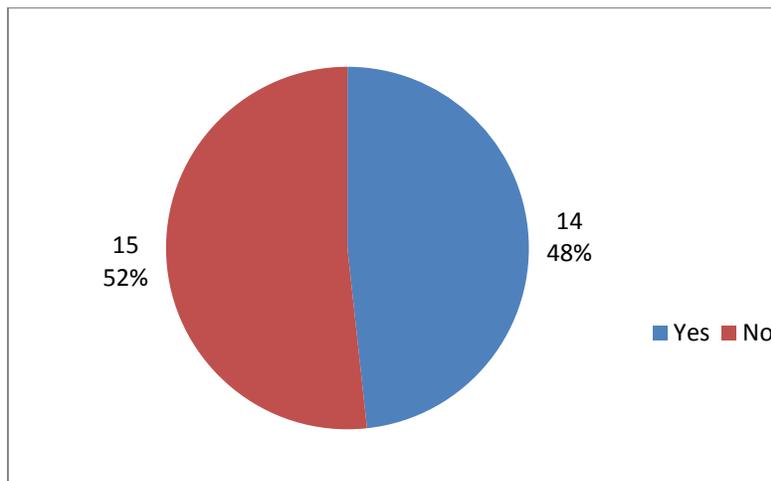
Additional Information Provided by States:[9]

- Tracked if they are reported to our agency.
- Yes, if the incident occurred as a result of any investigation and/or remediation conducted on a MRSs or FUDS.
- We do not have a specific agreement with EOD. Emergency response to military munitions is one of their missions. There is not a formal agreement for EOD to report incidents but we have received annual summaries of EOD response within the State. We have not received an annual summary since 2008.   My understanding is that they do maintain a database but we are not regularly provided the information. We review those incidents reported to the State to determine if there are locations that require repeated EOD responses.
- The State requires emergency permits for local, State and military EOD emergency response to military monitions. The emergency permits are tracked in a paper file.
- The State does not have an agreement with the military services. It also does not track incidents; however, the State EOC probably does.
- The State police is the primary emergency response action group; however, I am not aware of any such agreements.
- Some sites have negotiated agreements with local emergency response, but there is not a State-wide effort. Some sites voluntarily notify the State, but it is not required.
- Everything we know about incidents has been obtained "accidentally" through newspaper reports or second hand reports.

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[9] "State" or "the State" in these responses refers to the State Environmental Protection Agency unless otherwise specified.

- Emergency Response Incident Reporting Program
- Other State agencies are responsible for maintaining any such databases that may exist.
- The State initiated discussions with Air Force Base officials and the Army National Guard unit in attempts to develop possible agreements. The Air Force Base has some policy restrictions and is primarily concerned with managing activities within the confines of the Air Force Base. The MOA with the Army National Guard went through an initial round of review and is currently dormant.
- I am not aware of any such formal agreements. One military agency does notify the State whenever they respond to an incident.
- We try to track all EOD incidents. However, due to some of the issues above (e.g. we aren't notified of all incidents), sometimes we can only track incidents where we receive information
- An Army installation has EOD personnel that can respond to emergencies in some cases.
- State police have verbal agreement with U.S. Navy to help each other out as needed. If explosive is determined to be from military, the State police call the Navy.
- Some of the bases have MOUs and some do not. We maintain contact with the EOD teams via the base RCRA permit holder. We are notified when the base EOD team responds in accordance with the requirements in the RCRA permits. We also periodically get notification through our emergency response line.
- The State has an agreement with an Army installation concerning notification of all emergency ordnance responses conducted by the installation. The Army installation provides assistance to local law enforcement upon request regarding ordnance and will either detonate on-site or remove the ordnance to a secure location. The National Response Center will also notify the State of emergencies involving military ordnance.

I. **State/Federal Coordination**

Question 9e. Has your State been involved in implementing IRM controls at MRSs?

**Figure 16: State Involvement in IRM Implementation (29 State Responses)**

Additional Information, States responding "Yes":

- Yes, State is proactively involved with implementing IRM controls on MRSs especially FUDS due to most of these properties being privately owned. Also, it is important for the States to get involved to ensure that any deed notices or restrictions placed on private property are appropriately enforced to continue to protect human health and the environment.
- Yes, the State's role is to observe the implementation and ensure that the IRM controls are working correctly.
- Yes, we require IRM plans to be developed (formal or informal) for all MRS except small arms ranges. We are actively working with the services to implement appropriate IRM controls and have had good success at most sites.
- Yes, involved to the point of collaborating with the appropriate entities regarding risk management decisions.
- Yes, our parks division has looked at worker training and recognition awareness training with USACE. Also, park trail enhancements and signage language.
- Yes, we review draft warning signage reviews.
- Yes, controls are often a condition of approval for site actions.
- Yes, we have helped with distributing educational and attending public meetings to address citizen concerns.
- Yes, one former artillery range is owned by the State.
- Yes, the bases have digging permit process requirements. We have been able to help craft that process into the remedies for our sites. We have also been part of the community education at our FUDS in the State. Our agency has not been directly involved although we will attend public meetings held by USACE.
- Yes, reviewing and commenting on work plans.

Additional Information, States responding "No":

- Only review documents.
- No IRM controls have been implemented at sites in the State and none are planned. We don't expect that any will be needed.

Question 4b. Where IRM controls have been implemented has the State had the opportunity to provide review and comment on those controls prior to implementation? Yes or No. Please explain below.
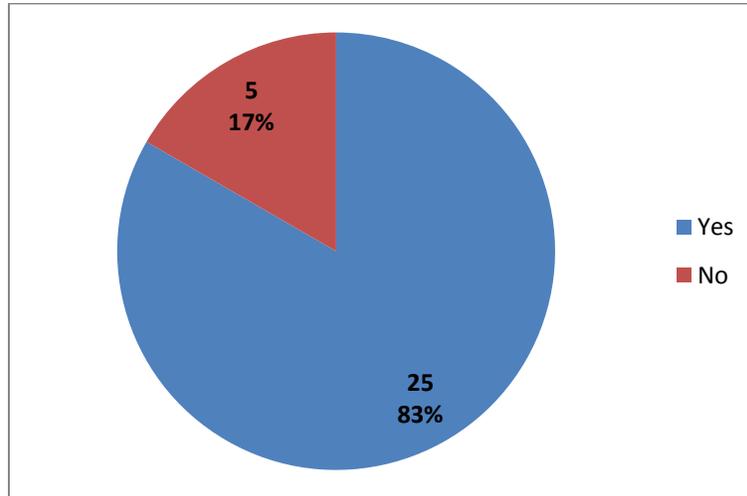
Figure 17: State Review of IRM Implementation (30 State Responses)

Additional Information (States answering "Yes"):

- We work with USACE to ensure protectiveness. IRM can be very broad considering the fact of what type of munitions release occurred and the type of exposure possible.
- Regulators are always given the opportunity to review and concur on IRM control documentation as well as LUC Implementation Plans. Normally, the State's concurrence is needed before DoD implements or commences any investigations and/or remediation.
- State is an active participant in all phases of the IRM program at one former installation. State typically has to request an IRM component when visiting remote FUDS.
- The State usually receives a report or work plan that proposes IRMs.
- The State and EPA have been fully engaged in the identification, development and review of IRM controls at all MMRP sites. The DoD Military Services have been very responsive and engaged in working with us to development and implement IRM controls.
- We did not have the opportunity to review the IRM controls we believe to be ineffective. These deed restrictions were placed on property in the 1940s. Current IRMs are subject to State review. We don't always agree, but we are allowed to review.
- Commented on proposed IRMs.
- At one site, an interim response action occurred and we reviewed the deed notice prior to implementation. At another site a DDSB approved clearance occurred and signage has been in place for years.
- The State has been able to review and comment on signage and information packets prior to distribution and has also been able to provide input on educational sessions prior to the classes being held.

- The State has been a champion of UXO IRM in both the BRAC and FUDS programs. Generally, DoD has responded to our comments but improvements have been slow in coming. At this point risk management does not seem effective, but at most sites the potential for public contact with live ordnance is fairly low because of geographic isolation. There are three sites, however, that do need more aggressive risk management.
- UXO recognition training to owners and workers (Park staff). Outreach materials and websites. POC information. Fact sheets. Availability sessions. Inspections of property records for change of ownership.
- In collaboration with a federal facility, IRM controls were determined for the apparent risks.
- Active sites and the BRAC site are operating under RCRA permits where State approval is required. FUDS are regulated under DSMOA and State approval is required.
- For one site, USACE provided State a draft copy of the signage for comment.
- State has input through DSMOA process.
- State reviews the IRM controls as part of the RCRA and/or CERCLA investigation/cleanup process. We work closely with the base RPMs to make sure that the SWMUs/AOCs/MRSs are identified appropriately.
- State is currently involved in the EE/CA process for a range. This EE/CA is being conducted specifically to determine if additional land use controls are needed to protect human health. State will provide review and comment on the EE/CA recommendations. State has had the opportunity to discuss land use controls concerning a disposal site. State will also have the opportunity to discuss the interim land use controls proposed for FUDS.
- Provided review and comment on work plans.
- Only in some instances. Generally military installations work with State to provide assurances that plans are implemented, even if not through formal comment processes. FUDS tend to have fewer controls and if implemented are done fairly unilaterally.

Additional Information (States answering "No")
- Sometimes we have been able to comment, and sometimes we have been able to ensure that interim controls are implemented (e.g. quickly getting educational materials for sites were MEC has been found but the extent and magnitude of the problem is not yet know).
- The fence was put up before we got involved at the site.
- The physical control IRM controls identified were implemented at inactive facilities that are under DoD control. Notification of property owners was done at FUDS practice bombing and gunnery target ranges. The master plan notations and digging permits requirements were implemented at an Active Air Force Base as part of military protocol, not requiring State concurrence.

Question 9a. Have there been instances where the State has requested IRM controls be implemented where none had yet been implemented? Yes/No? If yes, please explain below.
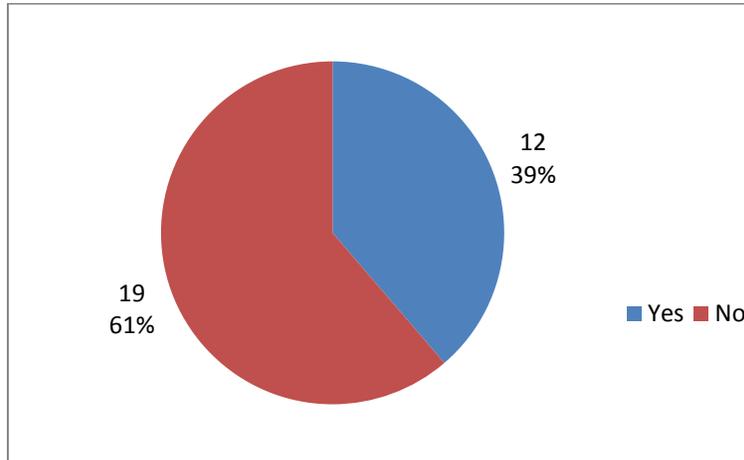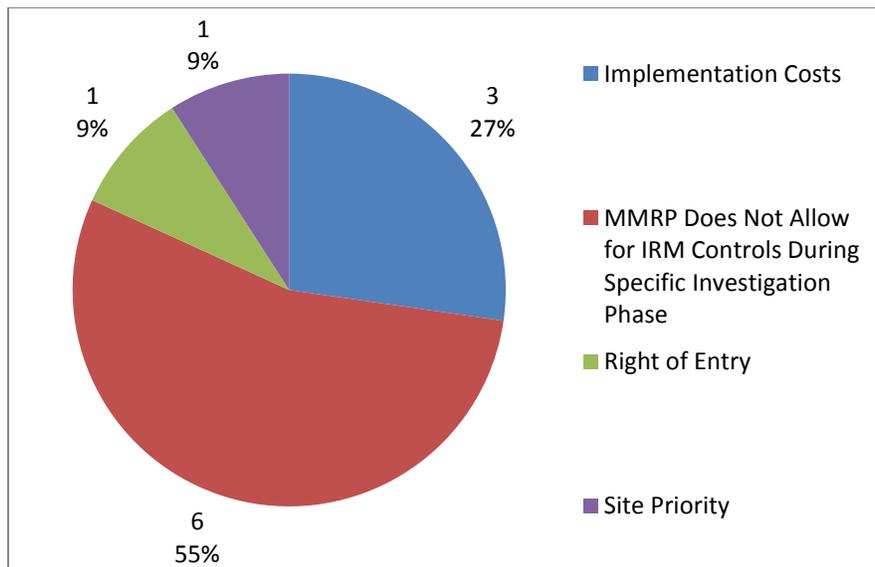

Figures 18: State requests for IRM controls (31 State Responses)

Additional Information:

- Notification of property owners and public officials is usually the initial step in implementing IRMs, but sometimes landowners are unaware of proposed investigations and/or removal actions until the work begins. This also makes community education and outreach extremely challenging.
- The FUDS program claims that they do not have funding to perform IRMs at many of their sites.
- In some cases "one-time" efforts have been performed or maybe signs are placed but there are no requirements for follow-up and/or continued maintenance of these programs.
- Developing, producing and delivering of signage.
- We have asked for IRM controls on a dozen or more FUDS sites and the USACE has refused. We feel there is a need for some sort of IRM at all sites with confirmed finding of UXO, munitions, etc.
- The USACE was reluctant initially (at conceptual level) to commit to IRM, but at most sites has generally been willing to implement controls at the individual facility level once the specific concerns were identified and risk management tools identified.
- Recently, FUDS sites have indicated that USACE Headquarters is not allowing implementation of IRM controls, including controls that are currently in place.
- The USACE is in the process of considering the State's requests at numerous FUDS. The expectation is that plans will be developed over the next couple years;
- Community had access to trails and rivers. Hunting and fishing were ongoing in these areas.
- Requested but not yet implemented.

- At one of our FUDS, we asked that community education be implemented as soon as possible.
- Required recreational user education as a RCRA interim measure for a recreation area that was constructed on a portion of an MRS.
- Our agency has requested in writing that the USACE install signage at access points to practice bombing ranges or use other public education tools (distribute pamphlets to landowners and the public). USACE has responded that it is not authorized to implement such requests at the SI phase. However, recently the USACE informed our agency that they are initiating a program to implement IRM controls for a select number of FUDS. Our agency will engage the local FUDS district concerning additional sites where we believe IRM controls should be implemented. State requested signage and public education and public notices in newspapers.

Question 9b. Where the components have rejected a State request to implement IRM controls, what has been the basis for their noncompliance?

Figure 19: Rejecting State Requests for IRM Controls (11 State Responses)

Question 9c: Do you have any examples where the funding for the implementation of IRM controls have caused delays in conducting additional response actions at these sites (e.g., funding for controls came out of the budget for investigation/response actions)?
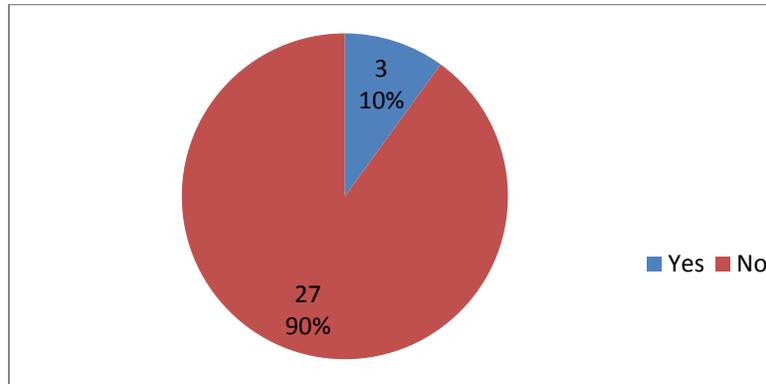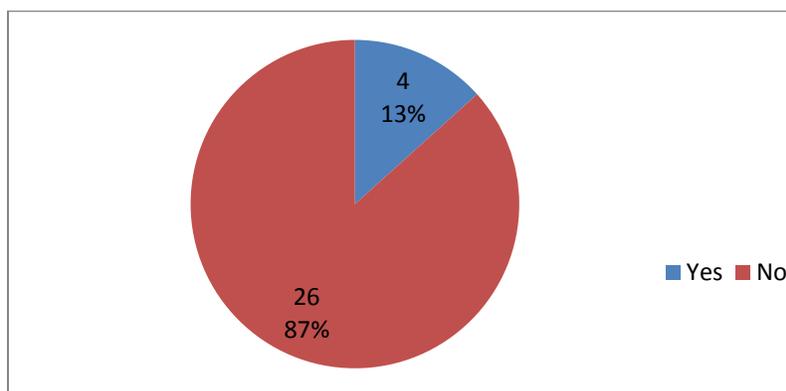

Figure 20: Funding and Cleanup Delays (31 State Responses)

Additional Information, States responding "Yes":

- At one site, USACE spent money on a database for the community so that they could conduct property searches to determine which parcels may have UXO on them. The money used to build and maintain the database came from funds to complete a partial RI. USACE did ask the community if they wanted the database but little community education was done to promote the database.
- Yes, at one site the USACE has a fixed annual RI/FS budget, thus any resources used to implement IRM controls cause a direct reduction in RI/FS resources and scope. USACE has allowed the State, U.S. EPA, and U.S. Forest Service to provide guidance on allocation of resources and the project team has consistently chosen IRM as the top priority.
- FUDS funding through DSMOA.

Question 9d. Do you have any examples where implementation of IRM controls have been used to justify delays in conducting additional investigation/response actions on the basis that these controls have reduced exposure risk and therefore changed the sequencing priority of these sites?

Figure 21: IRM Implementation and Cleanup Delays (31 State Responses)

Additional Information, States responding "Yes":
- At one site, the USACE believes the risk has been reduced by community education.
- Yes, when physical IRM controls are instituted then risk could be reduced which in turn change the priority of the site.
- Yes, at one FUDS, USACE felt that because the land owner was aware of the hazard and land access controlled to the former range, they had time to pursue a PRP determination even though munitions could wash up in other areas and the public had water access to the beach where MEC had been found.
- Yes/No (sometimes). The State concurs on IRM controls to be implemented before removals begin so that some risk is mitigated while the TCRA work plan is being reviewed. Ultimately, the goal is to manage risk and eliminate explosive hazards until a removal is commenced and complete.

Additional Information, State responding "No":
- IRM has had the opposite effect. With implementation of IRM Plans we have become more comfortable with the delays in response to lower priority sites.

J.   Additional Interim Risk Management Information

Question 14: Are you aware of any MEC accidents in your State over the past 10 years? If yes, please explain.
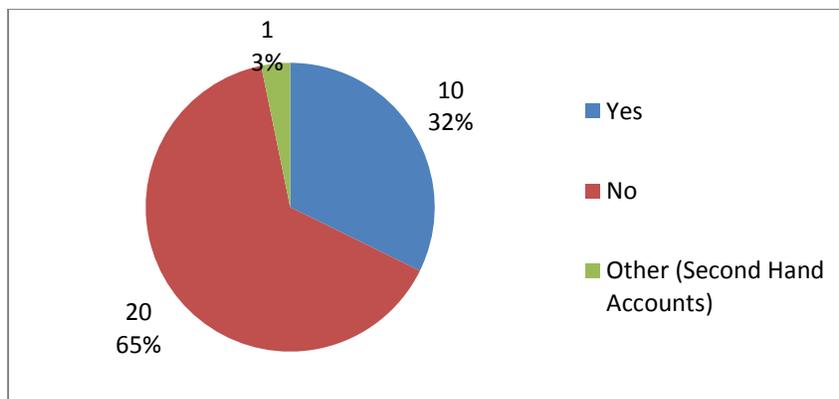
Figure 22: MEC Incidents in State, past 10 years (31 State Responses)

State Examples
- In 2006, a child stuck an artillery shell with another object. Two children were killed and four children were injured. In 2006 a teacher was injured when an old round of ammunition that he had found at a nearby construction site exploded in his classroom.
- In May 2005, a worker was injured by debris from a M23 firebomb igniter at a FUDS. The igniter was picked up with concrete debris from the site, placed in a rock crusher, kicked out of the rock crusher due to metallic components, landed on the ground and started to smoke. The employees gathered around the item and it detonated, throwing metal debris

at employees and white phosphorous on the equipment. One employee was treated at hospital for shrapnel injury to leg. There were other munitions incidents due to the public finding munitions, which did not result in reported accidents.

- A worker was cutting what was thought to be inert shapes and an explosion occurred. (Note: at the time it was being handled as an IR site, and has since been transferred to the MMRP)
- Fisherman brought item from underwater to a clam cleaning plant; a live item found at a facility ended in casualty of a teen.
- Numerous incidents have occurred with UXO teams being brought into dispose of items. In other cases the MEC has been inert but mishandled by on site personnel.
- No additional information available but we are aware of such incidents.
- Mercury fulminate disposed in the ground via a pipe at a defense plant worked its way to the surface and exploded when a lawnmower struck it. Mower operator was not injured.
- We have a database of all the incidents reported along one area of the State. Aware of incidents at Air Force Base. Aware of incidents at ammunition plant.
- Only second hand stories.
- State is not aware of any accidents involving MEC. However, we will be checking our databases to confirm this.
- 155 mm projectile discovered by homeowner, called Ordinance Support and MEC was transported; no one was injured. Person on ATV found UXO, picked it up, took home, and called local police; no one was injured.
- Man attempted to demilitarize civil war cannon ball and was killed. Two individuals killed when fire spread to shed and detonated 60mm mortar kept as souvenir.

Question 15: Please provide any other information you consider relevant to implementing IRM controls at properties with MRS.

- The greatest difficulty is that the odds of a real problem are very low. Thus the tendency has been to slap on some type of "institutional control" like a statement in a report that the site must not be used for certain activities and that statement is lost in official records. The biggest challenge in the long run will be tracking to see if the institutional controls are actually effective. We doubt that they will be, but until someone is hurt no one will monitor the risk management efforts for effectiveness.
- It would be great to have a GIS-based system that could be accessed by the State to document where MEC has been reported. I know the Army was working on something like this in the past. It would definitely be helpful to pull all this info to find if there are any unknown sites out there.
- From what I can tell, there is a need for USACE to be more proactive in its handling of MRS at various sites, particularly those at which there is the potential for affecting human health, or a high level of concern on the part of the public. Reporting of MEC findings appears to be haphazard, and not well recorded and/or communicated, if at all.
- For Questions on number of MRSs: This answered is qualified. The total number MRS is fluid; investigations are ongoing. For instance, three MRSs were identified at an airport,

which are FUDS eligible. However, they have not yet been added to the FUDS inventory. Many MRSs (primarily FUDS) have yet to be investigated (as far as I know).

- Recently USACE indicated it will be implementing IRM controls at a select number of FUDS in the District. USACE will also be issuing an IRM control guidance document within the near future. We consider this a significant first step forward towards reducing risk at FUDS munitions sites.
- The most important thing that ASTSWMO can do is work with the services and OSD to put out clear policy about responsibility and risk management while these sites are being investigated.
- It is very difficult to implement IRM controls at FUDS due to the fact DOD no longer owns the land. Land owners are reluctant to agree to IRM controls due to the cost to implement them and fears regarding land devaluation. At BRAC sites it is easier to implement IRM because DoD wants to transfer the land so they conduct removal actions and usually agree to land use controls. Active military facilities manage MRSs with security measures and base management plans.
- IRM is difficult at FUDS. USACE weary of taking on liability while forcing property owners to take IRM steps can be difficult.

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http://www.epa.gov/fedfac/documents/docs/munitions_response_guidelines.pdf.

U.S. EPA. *Munitions and Explosives of Concern Hazard Assessment Methodology (MEC HA), Interim Final*. October 2008.
http://www.epa.gov/fedfac/documents/mec_ha_methodology_interim.pdf.

APPENDIX C: GLOSSARY OF MUNITIONS RESPONSE TERMS

The source for the following select terms is the glossary for U.S. Environmental Protection Agency's *Munitions and Explosives of Concern Hazard Assessment Methodology (MEC HA), Interim Final* [http://www.epa.gov/fedfac/documents/mec_ha_methodology_interim.pdf]. The full glossary begins on page 62 of the linked document.

Basic types of munitions. Small arms ammunition, grenades, artillery ammunitions, bombs, pyrotechnics, rockets, jet-assisted take-offs, mines (sea/land), demolition materials, guided missiles, cartridge-actuated devices for aircraft use, torpedoes.

Engineering Controls. Engineered measures designed to prevent or limit access and exposure to hazardous components left in place at a site or to ensure effectiveness of the chosen remedy. Engineering controls are usually, but not always, fences or other physical barriers to a site.

Hazard. Any real or potential condition that can cause injury, illness, or death of personnel; damage to or loss of a system, equipment, or property; or damage to the environment.

Institutional controls. Non-engineered measures designed to prevent or limit exposure to hazardous substances left in place at a site or to ensure effectiveness of the chosen remedy. Institutional controls are usually, but not always, legal controls, such as easements, restrictive covenants, and zoning ordinances.

Land use controls (LUCs). Any type of physical (engineering controls), or legal, or administrative mechanisms (institutional controls) that restrict the use of, or limit access to, real property to prevent or reduce risks to human health, safety, and the environment. The objective of LUCs is to ensure that future land use remains compatible with the land use that was the basis for the evaluation, selection, and implementation of the response action. As such, LUCs are a common component of any response action that does not allow for unrestricted land use following the completion of the response action or of any response action that allows for unrestricted use, but that requires that the integrity of the remedy be protected. For example, in the case of a response to address military munitions (i.e., UXO or DMM), LUCs will likely be necessary to ensure protection of human health, public safety, and the environment, since technical limitations suggest that complete removal of the military munitions may not be possible.

Military munitions. All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition

charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 2710(e)(3) and 40 CFR 260.10).

Munitions response site (MRS). A discrete location within an MRA that is known to require a munitions response (32 CFR Part 179).

Munitions Response Site Prioritization Protocol (Protocol). A DoD protocol whose purpose is to assign a relative priority for munitions response to each location in the inventory of munitions response sites known or suspected of containing unexploded ordnance, discarded military munitions, or munitions constituents.

Remedial action (or Remedy). Those actions consistent with a permanent remedy taken instead of, or in addition to, a removal action in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present of future public health or welfare or the environment. (40 CFR 300.430(d)(1)).

Removal action. Short-term response actions under CERCLA that address immediate threats to public health and the environment. (40 CFR 300.415);

Risk. The product of the probability or frequency that an accident will occur within a certain time and the accident's consequences to people, property, or the environment.

Risk management. A process by which decision-makers reduce or offset risk.

Site Accessibility. Used in the MEC HA as an input factor to indicate the ease with which people can access an MRS. The input factor captures the contribution that such receptor activities make to the likelihood that a receptor will encounter a MEC item.