



REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
**US ARMY DEFENSE AMMUNITION CENTER**  
**1 C TREE ROAD**  
**MCALESTER OK 74501-9053**

SJMAC-ESM

11 May 2009

MEMORANDUM FOR Department of Defense Explosives Safety Board  
(DDESB-PE/Mr. Alchowiak), 2461 Eisenhower Avenue, Alexandria, VA 22331-0600

SUBJECT: Amendment 7 to the McClellan Development Authority (MDA) Explosives Safety Submission (ESS) for the Munitions and Explosives of Concern (MEC) Removal Action at Fort McClellan, AL

1. References:

a. Memorandum, McClellan Development Authority, (Matrix Environmental Services, LLC/Mr. Satkin), 28 Apr 09, subject: Transmittal of Amendment 7 to Conventional Explosives Safety Submission (ESS) McClellan (enclosed).

b. DOD 6055.09-STD, Ammunition and Explosives Safety Standards, dated 29 Feb 08 with Change 1 dated 24 Mar 09.

c. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 16 May 06, subject: Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, AL.

d. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 7 Aug 06, subject: Amendment 1 to the Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, AL.

e. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 23 Jul 07, subject: Amendment 2 to the Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, AL.

f. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 24 Jan 08, subject: DDESB Approval of Transmittal of Amendment 3 to Conventional Explosives Safety Submission (ESS), McClellan.

g. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 4 Mar 08, subject: DDESB Approval of Transmittal of Amendment 4 to Conventional Explosives Safety Submission (ESS), McClellan, AL.

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h. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 17 Jul 08, subject: DDESB Approval of Transmittal of Amendment 5 to the Explosives Safety Submission (ESS) for Munitions and Explosives of Concern (MEC) Removal Action at McClellan, AL.

i. Memorandum, Department of Defense Explosives Safety Board, DDESB-PE, 5 Mar 09, subject: DDESB Approval of Amendment 6 to the Explosives Safety Submission (ESS) for Munitions and Explosives of Concern (MEC) Removal Action at McClellan, AL.

2. Reference 1.a with enclosed Amendment 7 is provided for your review IAW with chapter 12 of reference 1.b. Your office approved the basic ESS in reference 1.c and Amendments 1 thru 6 in references 1.d thru 1.i respectively. We have reviewed the enclosed Amendment 7 and find it acceptable as written. Please furnish your comments and/or approval to us by 22 Jun 09, so we can make any changes required and forward final approval.

3. This amendment creates a sub-area within Munitions Response Site 6 (MRS-6). The sub-area will use 105MM HE, M1 as the munition with the greatest fragmentation distance (MGFD), while the MGFD for the remainder of MRS-6 will remain the same. All other aspects of the original ESS with Amendments 1 thru 6 are unchanged.

4. The POC is Mr. James Toburen, SJMAC-ESM, DSN 956-8784, or COMML (918) 420-8784, email james.toburen@us.army.mil.

FOR THE DIRECTOR:

1 Encl  
as

for/ CLIFFORD H. DOYLE  
MEC Team Leader  
Explosives Safety Knowledge, OE and  
Chemical Division  
US Army Technical Center for Explosives Safety

SJMAC-ESM

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SUBJECT: Amendment 7 to the McClellan Development Authority (MDA) Explosives Safety Submission (ESS) for the Munitions and Explosives of Concern (MEC) Removal Action at Fort McClellan, AL

CF (w/encl):

Office of the Director of Army Safety (DACS-SF/Mr. Patton), 223 23rd Street, Crystal Plaza 5, Suite 980, Arlington, VA 22202

Office of the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health, Special Assistant for Munitions, (DASA-DESOH/Mr. King), 110 Army Pentagon, Washington, DC 20310-0110

Office of the Assistant Chief of Staff for Installation Management, Base Realignment and Closure Office (DAIM-BD/Mr. Haughs), 600 Army Pentagon, Washington, DC 20310-0600

Matrix Environmental Services, LLC., (Mr. Richard Satkin, P.G.), 283 Rucker Street, Anniston, AL 36205



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April 28, 2009

Mr. James E. Toburen  
Defense Ammunition Center  
US Army Technical Center for Explosives Safety  
ATTN: SJMAC-ESM (Mr. Toburen)  
Building 35, 1C Tree Road  
McAlester, OK, 74501-9053

Subject: Transmittal of Amendment 7 to Conventional Explosives Safety Submission  
(ESS) McClellan

Dear Mr. Toburen:

Munitions and explosives of concern (MEC) remediation is being conducted for specific munitions response sites at the former Fort McClellan in Anniston, Alabama. Fort McClellan was closed under the Base Realignment and Closure Act (BRAC) as recommended by the 1995 Defense Base Closure Realignment Commission. This MEC remediation work is being conducted to clear land for use in redevelopment, which is covered and funded in accordance with an Environmental Services Cooperative Agreement (ESCA) No. DASW01-03-2-001 between the Department of the Army and the McClellan Development Authority (MDA), formerly the Anniston-Calhoun County Fort McClellan Development Joint Powers Authority (JPA). Provisions in the ESCA required the preparation and approval of an ESS through USATCES and DDESB. This amendment adds a subarea containing a new MGFD in munitions response site (MRS-6).

Matrix Environmental Services, LLC. is submitting this ESS amendment on behalf of the MDA. Please contact me at richard\_satkin@matrixdesigngroup.com or (256) 847-0780 if you have any questions on this amendment. Thank you very much.

Best regards,

MATRIX ENVIRONMENTAL SERVICES, LLC.

Richard L. Satkin, P.G.  
Senior Project Manager

c: Robin Scott - MDA

# **Amendment 07**

## **Explosives Safety Submission (Conventional)**

**MEC Remediation at McClellan**  
**MRS - 6**  
**Anniston, Alabama**



Prepared for the Calhoun County  
McClellan Development Authority



Prepared by:  
Matrix Environmental Services, LLC  
April 2009

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## LIST OF ACRONYMS

DDESB	Department of Defense Explosives Safety Board
DoD	Department of Defense
EBP	Eastern Bypass
EE/CA	Engineering Evaluation/Cost Analysis
ESS	Explosives Safety Submission
EZ	Exclusion Zone
ft	Foot / Feet
HE	High Explosive
HEAT	High Explosive Anti-Tank
IBD	Inhabited Building Distance
JPA	Joint Powers Authority
MEC	Munitions and Explosives of Concern
Mk	Mark
mm	Millimeter
MGFD	Munition with the Greatest Fragmentation Distance
MRA	Munitions Response Area
MRS	Munitions Response Site
MSD	Minimum Separation Distance
NEW	Net Explosive Weight
Q-D	Quantity-Distance
STD	Standard
TSD	Team Separation Distance
TTFWI	Tetra Tech Foster Wheeler, Inc.
USACE	United States Army Corps of Engineers
USATCES	U.S. Army Technical Center for Explosives Safety
UXO	Unexploded Ordnance

## **1.0 PURPOSE OF AMENDMENT**

This amendment to the approved Explosives Safety Submission (ESS) for Munitions and Explosives of Concern (MEC) remediation at McClellan (USATCES approval memo dated 22 May 2006) is being submitted to modify the MGFDF for munitions response site (MRS) MRS-6. The MGFDF for this site as approved in Amendment 05 to the ESS is a M49A3, 60mm HE Mortar. The M1, 105mm HE Projectile (unfired) was recovered during remediation activities in MRS-6 necessitating a change in the MGFDF for a subarea of MRS-6.

## **2.0 PHYSICAL CHANGES FROM APPROVED ESS**

### **2.1 MRS-6**

There are no physical changes from the approved ESS.

### **2.2 MRS-6 Hazard Assessment**

During remediation activities in MRS-6, two unfired M1, 105mm HE Projectiles were recovered. The rotating bands were unscored and these items were classified as discarded military munitions. Remnants from a third 105mm HE Projectile were also recovered. Because the rotating band was unscored this item is believed to have come from a kick-out of an incomplete intentional detonation. The area containing the 105mm discoveries will be used to establish a second corresponding exclusion zone (EZ) in MRS-6. The minimum separation distance (MSD, the distance that must be maintained between MEC operations and nonessential personnel) will also be the daily exclusion zone (EZ) for remediation activities.

USACE has intrusively investigated millions of surface MEC items and subsurface anomalies that have the potential to be unexploded ordnance over the past 15 years on more than 1,000 project locations for FUDS, BRAC, and Active installations. These are extremely conservative estimates. On one project alone, USACE investigated over 3,000,000 anomalies, of which approximately 1.67% were UXO with no accidents or unintentional detonations. For these reasons, the probability of an unintentional detonation, due to project activities, is assessed to be "Extremely Low" and the use of the Hazardous Fragment Distance (HFD) for the MSD for non-essential personnel for unintentional detonations is warranted and authorized.

The Fragmentation Data Review Form for the M1, 105mm HE Projectile is provided in Table 2-1. The MGFDF and corresponding EZ distance for the area containing 105mm HE Projectiles in MRS-6 is shown in Figure 2-1. The EZ and MSD for an unintentional detonation during intrusive operations in the area of the 105mm discoveries is 341 feet and represents the Quantity-Distance (Q-D) Arc based on the HFD of the M1, 105mm HE Projectile. In the remainder of MRS-6, the EZ and MSD for an unintentional detonation is 166 feet based on the M49A3, 60mm HE Mortar as approved in Amendment 05 to the ESS (USATCES approval memo dated 24 July 2008).

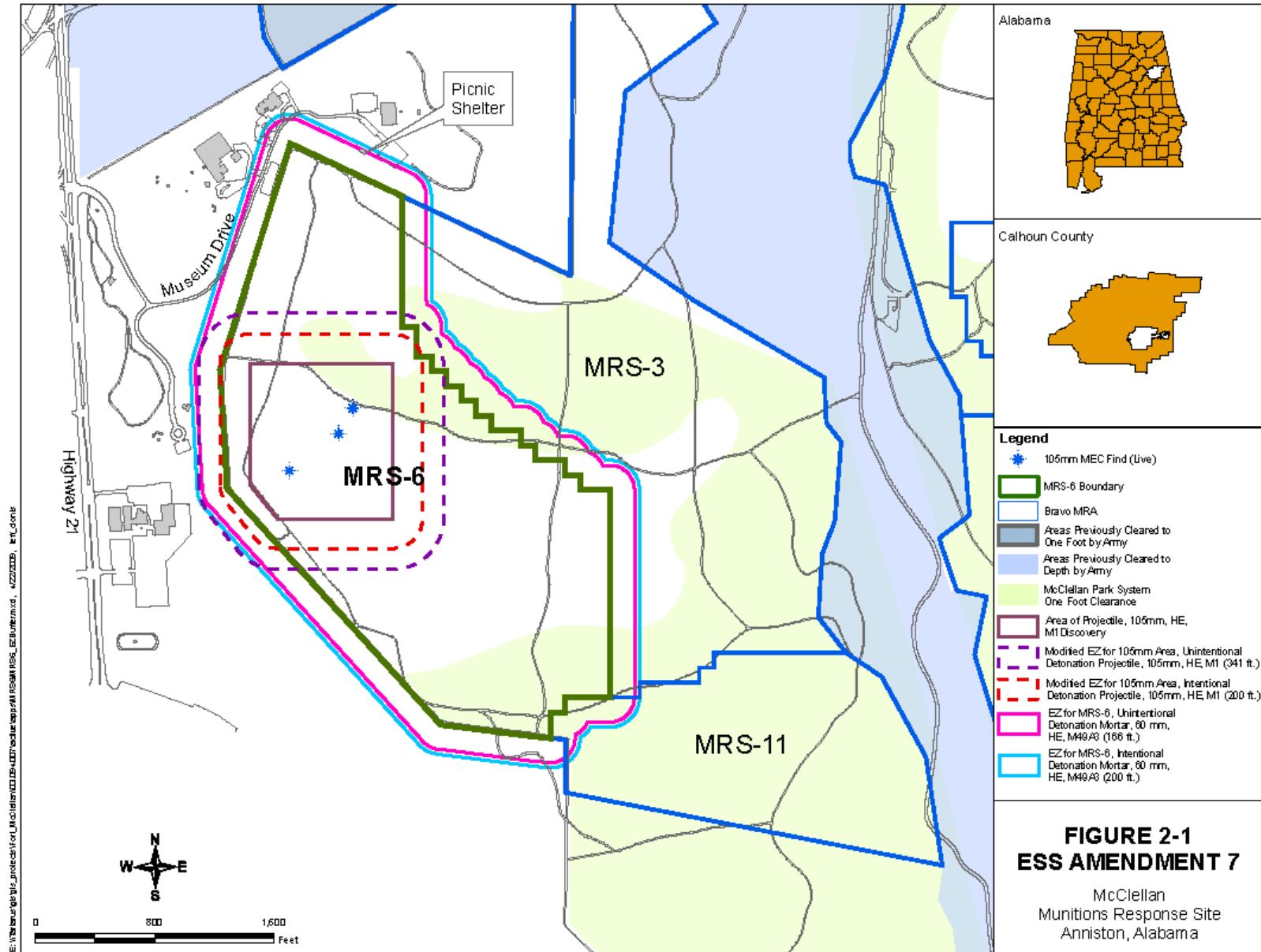
The maximum fragment range for the M1, 105mm HE Projectile is 1939 feet and is the EZ and MSD for intentional detonations. For any intentional detonation where any portion of the 1939 foot arc would extend offsite engineering controls will be used to reduce the EZ and MSD and to mitigate the potential fragmentation and blast hazards. The EZ and MSD for an intentional detonation with engineering controls is 200 feet. Engineering controls for intentional detonations will be used as described in the *Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions*, HNC-ED-CS-S-98-7 dated August 1998 or in the *Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation*

*of Munitions*, HNC- ED-CS-S-00-3, dated September 2000. The maximum extent of the MRS-6 EZ extends off of McClellan to the west and north on to City of Anniston property as indicated on Figure 2-1. There is a picnic shelter present within the EZ which is part of a community center managed by the City of Anniston Parks & Recreation department which is used periodically. Also, a portion of Museum Drive and parking lots are located in the EZ and it is also noted on Figure 2-1. Closure of Museum Drive, parking lots and the picnic shelter will be coordinated with the Parks & Recreation department and all potentially affected areas will be evacuated and guarded during intentional detonations to ensure that the EZ will be effectively secured during MEC operations in MRS-6.

We propose to utilize a team separation distances (TSD) of 78 feet in the area of the 105mm discoveries and maintain 34 feet elsewhere (based on the M49A3, 60mm HE Mortar) in accordance with the September 11, 2007 Technical Update, Implementation of DDESB Guidance on Minimum Separation Distances for Unintentional Detonations. The TSD is based on the K40 distance for the respective MGF D obtained from the Fragmentation Database (database was provided by Lea Ann Cotton, DDESB on November 7, 2007) as shown in Table 2-1.

### **3.0 PROCESS CHANGES FROM APPROVED ESS**

There are no process changes from the approved ESS.



**Table 2-1 Fragmentation Data Review Form for Projectile, 105mm, HE, M1**

<b>FRAGMENTATION DATA REVIEW FORM</b>			
Database Revision Date 12/31/07			
Category:	<input type="text" value="HE Rounds"/>	DODIC:	<input type="text" value="C445"/>
Munition:	<input type="text" value="105 mm M1"/>	Date Record Created:	<input type="text" value="7/30/2004"/>
Primary Database Category:	<input type="text" value="projectile"/>	Last Date Record Updated:	<input type="text" value="7/30/2004"/>
Secondary Database Category:	<input type="text" value="105 mm"/>	Individual Last Updated Record:	<input type="text" value="Crull"/>
Munition Case Classification:	<input type="text" value="Robust"/>	Date Record Retired:	<input type="text"/>

<p style="text-align: center;"><b>Munition Information and Fragmentation Characteristics</b></p> <p>Explosive Type: <input type="text" value="Comp B"/></p> <p>Explosive Weight (lb): <input type="text" value="5.07000"/></p> <p>Diameter (in): <input type="text" value="4.1339"/></p> <p>Max Fragment Weight (lb): <input type="text" value="0.205734"/></p> <p>Critical Fragment Velocity (fps): <input type="text" value="4055"/></p>	<p style="text-align: center;"><b>Theoretical Calculated Fragment Range</b></p> <p>HFD [Range to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft): <input type="text" value="341"/></p> <p>MFR-V [Vertical Range of Max Weight Fragment] (ft): <input type="text" value="1494"/></p> <p>MFR-H [Horizontal Range of Maximum Weight Fragment] (ft): <input type="text" value="1939"/></p>
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<p style="text-align: center;"><b>Overpressure Distances</b></p> <p>Inhabited Building Distance (12 psi), K40 Distance: <input type="text" value="78"/></p> <p>Inhabited Building Distance (09 psi), K50 Distance: <input type="text" value="97"/></p> <p>Intentional MSD (0065 psi), K328 Distance: <input type="text" value="636"/></p>	<p style="text-align: center;"><b>Minimum Thickness to Prevent Perforation</b></p> <p>4000 psi Concrete (Prevent Spall): <input type="text" value="4.79"/></p> <p>Mild Steel: <input type="text" value="0.90"/></p> <p>Hard Steel: <input type="text" value="0.74"/></p> <p>Aluminum: <input type="text" value="1.87"/></p> <p>LEXAN: <input type="text" value="5.36"/></p> <p>Plexi-glass: <input type="text" value="3.84"/></p> <p>Bullet Resist Glass: <input type="text" value="3.19"/></p>
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<p style="text-align: center;"><b>Required Sandbag Thickness</b></p> <p>Max Fragment Weight (lb)SB: <input type="text" value="0.205734"/></p> <p>Critical Fragment Velocity (fps)SB: <input type="text" value="4055"/></p> <p>Kinetic Energy 106 (lb-ft<sup>2</sup>/s<sup>2</sup>)SB: <input type="text" value="1.6914"/></p> <p>Required Wall Roof Sandbag Thickness (in)SB: <input type="text" value="24"/></p> <p>Expected Maximum Sandbag Throw Distance (ft)SB: <input type="text" value="135"/></p> <p>Minimum Separation Distance (ft)SB: <input type="text" value="200"/></p>	<p style="text-align: center;"><b>Water Containment System and Minimum Separation Distance:</b></p> <p>Max Fragment Weight (lb)W: <input type="text" value="0.205734"/></p> <p>Critical Fragment Velocity (fps)W: <input type="text" value="4055"/></p> <p>Kinetic Energy 106 (lb-ft<sup>2</sup>/s<sup>2</sup>)W: <input type="text" value="1.6914"/></p> <p>Water Containment System: <input type="text" value="1100 gal tank"/></p> <p>Minimum Separation Distance (ft)W: <input type="text" value="200"/></p>
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