APPENDIX D

USATEU MINICAM RESULTS

AND SOP FOR THE MINICAMS

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: T-5 Toxic Hazards Detection and Decontamination Training Area

1. Background - "Area T-5 is the Toxic Hazards Detection and Decontamination Training Area located between Sunset Hill and Howitzer Hill (see Figure 2-7). The 11.4 -acre site was used between 1961 and 1973 to train students in the methods of detecting and decontaminating toxic agents (HD and HX). GB also is reported as being used. The quantities of agent used in training exercises ranged for 20 to 40 milliliters per exercise. The training sites were decontaminated and checked at the end of each exercise. Decontamination of the agents on residual soils was performed by adding STB and/or DS-02. In addition to HD, HX, and GB used during training, the site may have been the location of a 110 gallon HD spill. Available evidence indicates that the contaminated soil was chemically decontaminated, removed, and ultimately disposed of at Range J (Pelham Range). Surfical soil samples were taken at the unit in December 1972, April 1973, and July 1973 and analyzed for chemical agents HD, GB, and VX, with all results being below detection limits. The area was permitted of surface use because subsurface sampling was not conducted. Survey monuments "C" and "D" were located in the field during an October 1991 site visit. Additional building foundations and an asphalt pad also were found at this time. Are T-5 is heavily wooded." Section 2.2.1.3 pp. 2-19-2-20 Task Order 1 Site Investigation Work Plan, Fort McClellan, Alabama SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
15 Apr	T5-WO1	N/A	N/A
	T5-D01	N/A	N/A
16 Apr	T5-S0401	12-15"	0.05 HD 0.01 GB 0.15 VX
	T5-S0402	74-76"	0.00 HD 0.00 GB 0.23 VX
	T5-S0301	9-12"	0.04 HD 0.00 GB 0.00 VX

SMCTE-TB (50-1)
SUBJECT: Fort McClellan Site Investigation: T-5 Toxic Hazards Detection and Decontamination Training Area

1 June 1992

	T5-S0302	60-63"	0.04 HD 0.00 GB 0.19 VX
	T5-S0201	9-12"	0.04 HD 0.01 GB 0.12 VX
16 Apr	T5-S0202	57-60"	0.03 HD 0.00 GB 0.15 VX
22 Apr	T5-S0101	13-15"	0.36 HD 0.00 GB 0.00 VX
	T5-S0102	63-65"	0.21 HD 0.00 GB 0.20 VX

3. Observations - Readings CMS personnel determined these reading (ie .19, .12, .15, .36, .21 and .20) to be from background sources.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: T-6 Agent Decontamination Training Area

1. Background - "Area T-6 was an Agent Decontamination Training Area also referred to as Naylor Field) located near the based of the eastern slope of Howitzer Hill (see Figure 2-8). The 7.5 acre site was used until 1973 for training in techniques of decontamination chemical agents, including HD. The area contained eight training sites that consisted of concrete pads on which equipment was parked. The equipment was contaminated with not more than 40 milliliters of HD during each exercise. Decontaminants STB and DS-2 were used during the exercises. Random surface soil samples taken at the site in March 1973 revealed no agent contamination, and the area was cleared for surface activity. Subsurface sampling has not been conducted in Area T-5. Several concrete pad structures and a small metal hut were located on the heavily wooded site during an October 1991 site visit." Section 2.2.1.4 p2-20 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama, SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
24 Apr	T6-S0301	10-12"	0.00 HD
	T6-S0302	60-64"	0.00 HD
29 Apr	T6-S0201	8-11"	0.00 HD
	T6-S0202	58-64"	0.00 HD
	T6-S0101	8-11"	0.00 HD
	T6-S0102	60-66"	0.00 HD

3. Observations - No detectable levels of chemical agents were identified. Above readings are charactisitic of general backgroun noise.

SMCTE-TB (50-1)
SUBJECT: Fort McClellan Site Investigation: T-6 Agent Decontamination Training Area

1 June 1992

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: T-24a Chemical Munitions Disposal Training Area

1. Background - "Area T-24A was a Chemical/Munitions Disposal training area located on the main post south of Holloway Hill (see Figure 2-11). The 1.5-acre site was used until 1973 for chemical munitions disposal training with CG, BZ, GB, and HD. Quantities of HD sued during each training exercise were approximately 4.46 kilograms. Quantities of CG, B2 (sic), and GB were 40 milliliters, on M-6 canister, and 740 grams, respectively, per exercise. Two square burning pits, each 16 feet on a side, were used for training exercises and were enclosed by a fenced area measuring 40 by 80 meters. The depths of the pits are unknown; however, standard operating procedures (SOPs) recommended a depth of 6 feet. At closure, the pits reportedly were filled with soil, although some depressions were observed in 1988. Decontaminations of agents on residual soils was performed with STB and DS-2. The site may have had a large HD spill in the past, although this has not been confirmed. Surface sampling conducted in April and July 1973 in the proximity of the pits was negative for the agents in question. Sample depths ranged from 3 to 10 centimeters, and therefore, may not have represented the depths at which agents may have been in the training pits. An unauthorized dump was identified in 1990 at the western end of the fenced area. The enclosed site area was heavily overgrown during an October 1991 site visit. A survey marker was located within the enclosure showing the location of a former burn pit. Two 81-mm mortar shells also discovered at the site in October 1991." Section 2.2.1.7 pp. 2-27 - 2-29 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
24 Apr	T24A-W01	N/A	N/A
	T24A-D01	N/A	N/A
	T24A-S0201	8-11"	0.00 HD 0.00 GB
	T24A-S0202	50-54"	0.00 HD 0.00 GB
	T24A-S0101	9-12"	0.00 HD 0.00 GB

SMCTE-TB (50-1)
SUBJECT: Fort McClellan Site Investigation: T-24a Chemical Munitions Disposal Training Area

1 June 1992

T24A-S0102	34-36"	0.00 HD 0.00 GB

3. Observations - The only reading we received here was a 1.8 TWA for GB right after refueling the drill rig. When sampling tube were placed away from the drill rig, the next reading proved negative.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: T-31 Technical Escort Reaction Area

1. Background - "Area T-31 (Technical EScort Reaction Area) was a toxic hazard training area located on the main post (see figure 2-9) near Range 31. The 3.4 - acre site was used between 1957 and 1969 for training with GB and HD in quantities of 20 to 40 milliliters. Six different sites within Are T-31 were used for training exercises. Training aids used a the site were moved to area T-38. Area T-31 was used to store undetermined types of chemical agents. Several spills were reported to have occurred on site from these stored materials. No information is available on quantities of materials spilled. The types and quantities of decontaminants used to treat residual soils contaminated with agents are currently unavailable, but are believed to have included STB and DS-2. No sampling has been conducted at the site. The site area was heavily overgrown during an October 1991 site visit. Several concrete pads and structures were located at that time." Section 2.2.1.5 pp. 2-23 - 2-26 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama, SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
20 Apr	T31-W01	N/A	N/A
	T31SW01	N/A	N/A
	T31-D01	N/A	N/A
	T31DD01	N/A	N/A
	T31-S0201	9-12"	0.00 HD 0.01 GB
	T31-S0202	57-60"	0.00 HD 0.01 GB
22 Apr	T31-S0301	10-13"	0.00 HD 0.00 GB
	T31-S0302	67-70"	0.00 HD 0.00 GB
	T31-S0401	12-18"	0.03 HD 0.00 GB
	T31-S0402	67-70"	0.00 HD 0.00 GB

SMCTE-TB (50-1)
SUBJECT: Fort McClellan Site Investigation: T-31 Technical Escort Reaction Area

1 June 1992

	T31-S0101	11-14"	0.04 HD 0.00 GB
	T31-S0102	60-63"	0.00 HD 0.00 GB
29 Apr	T31S30101	6-9"	
	T31DW01	N/A	N/A

3. Observation - No detectable levels of chemical agents were identified. Above readings are charactistic of general background noise. No procedure available to screen water samples. It was determined that because soil samples were clear that water samples would also have no detectable levels of chemical agents.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: T-38 Technical Escort Reaction Area

1. Background - "Area T-38 (Technical Escort Reaction Area) is located on the main post west of Reservoir Hill (shown in figure 2-10). The 6-acre site was used between 1961 and 1972 for training escort personnel in techniques of eliminating toxic hazards caused by mishaps to chemical munitions during transport. The area also was used for storage of toxic agents and munitions, including GB, VX, and HD. Storage included four 1-ton HD containers. In addition, unspecified decontaminants (likely STB and DS-2) were stored on at least two sites and were used for reported spills and contaminated training aids. Residual surface contamination with HD was reported in January 1973. Subsequent sampling March 1973 indicated that Area T-38 was free from surface contamination. No subsurface sampling or water quality monitoring has occurred at this site. A concrete decontamination pad was located in the field during and October 1991 site visit. In addition, there is an unconfirmed report of the burial of a drum of agent in the southern portion of the site (location not specified). Section 2.2.1.6 p 2-26, Task Order 1, Site Investigation Work Plan, Fort McClellan, Alabama, SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
23 Apr	T38-S0201	9-12"	0.00 HD 0.00 GB 0.10 VX
	T38-S0202	60-67"	0.11 HD 0.00 GB 0.00 VX
	T38-S0101	9-12"	0.00 HD 0.00 GB 0.10 VX
	T38-S0102	60-67"	0.16 HD 0.00 GB 0.09 VX
	T38-S0401	13-15"	0.58 HD 0.00 GB 0.00 VX

SMCTE-TB (50-1)
SUBJECT: Fort McClellan Site Investigation: T-38 Technical Escort Reaction Are

1 June 1992

T38-S0402	60-67"	0.52 HD 0.00 GB 0.18 VX
T38-S0301 T38DS0301	7-10"	0.00 HD 0.00 GB 0.09 VX

3. Observation - CMS personnel were consulted regarding these readings. CMS personnel and I determined these readings (ie .10, .11, .10, .16, .58 and .52) to be from background sources. Other reading are characteristic of general background noise.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: Old Toxic Training Area

1. Background - "The Old Toxic Training Area is located within a fenced area on the main post behind building 3183 (see Figure 2-12). The 10,000 square-foot ditch area was used during the 1950's for training exercises in the identification and detection of HD. The quantities of agent used during training are not documented. Additionally, documented evidence that other agents also may have been used in this area is not available. According to facility personnel, the chemicals were placed on the ground surface. Decontaminants such as STB and DS-2 were likely used on surfical soils, but their quantities are not known. Chemical agents appear to have been placed on the ground surface and likely decontaminated with STB and DS-2. No sampling has been conducted at the Old Toxic Training Area." Section 2.2.1.8 p 2-29, Task Order 1, Site Investigation Work Plan, Fort McClellan, Alabama, SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
14 Apr	OTA-S0101	12-15"	0.00 HD
	OTA-S0102	58-60"	0.04 HD
	OTA-S0201	12-15"	0.03 HD
	OTA-S0202	62-64"	0.05 HD

3. Observation - No detectable levels of chemicals agents were identified. Above readings are charactistic of general background noise.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1)

1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation Range K

1. Background - "Range K was an Agent Training Area located on Pelham Range (see Figures 2-15 and 2-16). The 2-acre area was used for agent training. Limited information on the site is available, including time of operation and agents used. The site has been physically rearranged (bulldozed) and records indicate that the area was cleared in 1967. Surface monitoring was conducted in 1980 and no surface contamination was detected. No subsurface testing has been conducted. Evidence of a former training area at this site was not observed at the site during an October 1991 site tour. An approximately 5- foot diameter area of ponded drainage was noted in the site area. In addition, evidences of site usage as a bivouac area was observed." Section 2.2.1.11 p. 2-32 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama SAIC 8 Nov 91

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
27 Apr	RK-D01 RKDD01	N/A	N/A

3. Observation - Sediment samples were taken from the surface around water hole.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1) 1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: Range I - Agent Shell Tapping Area

1. Background - "Range I was an Agent Shell Tapping Area located on Pelham Range (see figure 2-13 and 2-16). The 0.5 - to 1-acre site was used between 1963 and 1964 for chemical agent shell tapping purposes. The agent used on site is assumed to have been HD. The area has been physically rearranged, with the top 2 feet of soil having been moved to an unknown location. A concrete marker was located at the site during an October 1991 site visit." Section 2.2.1.9 p 2-29 Task Order 1 Site Investigation Work Plan, Fort McClellan, Alabama, SAIC, 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
27 Apr	RI-S0201	9-12"	0.00 HD 0.01 GB 0.00 VX
	RI-S0202	60-67"	0.00 HD 0.00 GB 0.00 VX
	RI-S0101	9-12"	0.00 HD 0.00 GB 0.00 VX
	RI-S0102	60-67"	0.00 HD 0.00 GB 0.00 VX

3. Observation - No detectable levels of chemical agents were identified. Above readings are characteristic of general background noise.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1) 1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: Range J - Agent Training Area

1. Background - "Range J was an Agent Training Area located on Pelham Range (see Figure 2-14 and 2-16). The 139-by 50 foot fenced area was used until 1963 for training and agent disposal. The agents used at the site are unknown, but believed to be HD. The site also was reportedly used for disposal of a 110-gallon HD spill that occurred on the main post in 1955. Evidence of drummed soil disposed of at the site was observed at the site in October 1991. Limited monitoring has been conducted on site. Available data indicate that no surface contamination exists. A survey monument dated August 1973 was located within the fenced area during the October 1991 walkover." Section 2.2.1.9 p 2-29, Task Order 1, Site Investigation Work Plan, Fort McClellan, Alabama, SAIC 8 Nov 91.

2. Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
28 Apr	RJ-S0201 RJSS0201	8-12"	0.13 HD
	RJ-S0202	60-67"	0.00 HD
	RJ-S0401	3-6"	0.35 HD
	RJ-S0301 RJDS0301	8-12"	0.00 HD
	RJ-S0302	58-64"	0.00 HD
	RJ-S0101	9-12"	0.00 HD
	RJ-S0102	63-69"	0.00 HD

3. Observation - Above reading (.13) it was determined to be charactistic of general background noise. The reading at RJ-S0401 was taken from a rusty drum that was only 1/8 full and corroded through. This was the only reading that did mimic HD in the MINICAMS sampling gate but due to the weathering of the drummed soil it was determined not to be agent.

SMCTE-TB (50-1) 1 June 1992
SUBJECT: Fort McClellan Site Investigation: Range J - Agent Training Area

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1) 1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: The Detection and Identification area

1. Background - "The Detection and Identification (D and I) Area is located on the Main Post (see figure 2-5). The 1.1 acre site was used from the 1950's to 1972 for GB training. The Navy may have used mustard (HD) at the site in the late 1950's for training purposes. Training routinely consisted of application of tests kits to detection and identification agents contained in 40 milliliter vials. Agents often were mixed as a 10 percent solution with water. It has been reported that agent stimulants CK, GC, CX, and AC also were used the training area. All training aids from this site and a building from Area T-4 were burned twice in a dug pit and buried. The remains are still located in the pit. The pit containing the burned materials is identified by Stake F (see Figure 2-5). Decontaminants STB and DS-2 were used on surface soils and the area was cleared for surface use. Subsurface sampling at the site has not been conducted. the D and I Area is heavily wooded. A survey marker (stake "F") was found in the field during a recent site visit (October 1991) that approximately locates the former pit area." Section 2.2.1.1 p. 2-19 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama SAIC 8 Nov 91

2. Sampling Results:

DATE	SAMPLE NUMBER	SAMPLE DEPTH	MINICAM READING (TWA)
15 Apr	DIA-S0201	12-15"	0.03 HD 0.00 GB
	DIA-S0202	70-76"	0.03 HD 0.00 GB
	DIA-SO101 DIASS0101	12-18"	0.03 HD 0.00 GB
	DIA-S0102	70-74"	0.03 HD 0.00 GB

3. Observation - No detectable levels of chemical agents were identified. Above readings are charactisitc of general background noise.

SMCTE-TB (50-1) 1 June 1992
SUBJECT: Fort McClellan Site Investigation: The Detection and Identification area

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1) 1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: Range L (Lima Pond)

1. Background - "Range L was a Chemical Munitions Disposal Area located on Pelham Range (see figure 2-16). The 0.5-acre site reportedly was used for the disposal of captured World War II munitions, including chemical munitions. According to Post personnel, a shallow man-made pond (Lima Pond) was the dump site for these munitions. The pond is a bermed area topographically higher than the surrounding wooded terrain. The pond is estimated to be approximately 30 feet deep, although the actual depth of the pit below the pond bed is unknown. Three water sample were collected from Lima Pond in 1982 and analyzed for HD, VX, and GB. All analytical results were below detection limits for HD (i.e., 2mg/L), VX(i.e., 1.14 mg/L), and GB (i.e., 0.5 mg/L). However, no determination has been made on the presence or absence of munitions, and no pond sediment samples have been taken for analyses. Surface soil sampling at Range L indicated no detectable surface soil contamination. The depth of water in the pond was low (<2 feet) during an October 1991 site visit. Few indicators of munitions dumping were evident at the site, although empty ammunition crates were observed along the pond walls." Section 2.2.1.12 pp. 2-32, 2-36 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama SAIC 8 Nov 91.

2. Results: No samples taken

3. Observation - Mag sweeps showed large concentration of metal. Determination made not to collect any samples based on USATHAMA directive.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

SMCTE-TB (50-1) 1 June 1992

MEMORANDUM FOR RECORD

SUBJECT: Fort McClellan Site Investigation: Old Water Hole

1. Background - "The Old Water Hole is reportedly a disposal site located between New Mt. Sellers Cemetery and the prisoner of war (POW) camp on Pelham Range (see Figure 2-16). Post personnel reported that a variety of munitions, including chemical agents, may have been disposed of at a possible sinkhole. Efforts to locate the site have been unsuccessful. The site is reportedly a sinkhole, which would not have any release controls. A rectangular, shallow, topographic depression approximately 85 by 35 feet was located by Fort McClellan Department of Environmental Health personnel in the approximate area between the cemetery and the POW camp. An additional circular depression was located near the main depression in this area. Fort McClellan personnel indicate that the depression periodically fills with water, although it was dry during an October 1991 site visit. Several small-caliber bullet shells were found at the site." Section 2.2.1.13 p. 2-36 Task Order 1 Site Investigation Work Plan Fort McClellan, Alabama SAIC 8 Nov 91.

2. Results No samples taken.

3. Observation - Mag sweep showed large concentration of metal objects. Determination made not to collect any samples based on USATHAMA directive.

4. Site Manager is the undersigned. Site health and safety officer is 1LT Kost.

MICHAEL S. MCMULLEN
1LT, CM
Chief, 3rd Escort Division

STANDARD OPERATING PROCEDURES FOR MINICAMS

RECOMMENDED STANDARD OPERATING PROCEDURES FOR MINICAMS/ USED FOR SITE INVESTIGATIONS AT FT. McCLELLAN, ALABAMA

April 13-24, 1992

(DRAFT PLAN)

Prepared by

Dr. Gary D. Sides

April 8, 1992

CMS RESEARCH CORPORATION
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RECOMMENDED STANDARD OPERATING PROCEDURES FOR MINICAMS/ USED FOR SITE INVESTIGATIONS AT FT. McCLELLAN, ALABAMA

During the period April 13-24, 1992, the Technical Escort Unit from Aberdeen Proving Ground (Edgewood Arsenal), Maryland, will use two Fixed-Site MINICAMS mounted in Cut Vee military vehicles to sample for the presence of CW agents at 12 sites at Ft. McClellan, Alabama. Although the operator's manual for the MINICAMS will serve as the primary guide for personnel responsible for operating this equipment, the procedures given in the manual must be modified slightly to allow for the unique requirements of mobile monitoring and the relative inexperience of Technical Escort personnel in using automated low-level monitoring systems.

The breakdown of agents to be monitored at each of the 12 sites are as listed below:

5 sites	HD only
3	HD and GB
4	HD, GB and VX

Two MINICAMS were loaned to the Technical Escort Unit. These MINICAMS will be used as follows:

- MINICAMS S/N 1361 will be used to monitor for HD at all 12 sites.
- MINICAMS S/N 1587 will be used to monitor for GB only at 3 sites or GB and VX (at 7 sites).

MINICAMS S/N 1587 could also be converted to the HD mode of operation if there is a problem with MINICAMS S/N 1361 (which, as noted, will be dedicated to HD monitoring).

IN CASE OF PROBLEMS

Although Technical Escort Unit (TEU) personnel were trained in the operation and routine preventive maintenance of MINICAMS during the week of April 6-10, they may encounter problems or have questions concerning the operation of the monitoring equipment provided. Because of the importance of the site investigations at Ft. McClellan, TEU personnel should telephone EG&G staff (Mr. Steve Phillips or Mr. Jimmy Jones, 205-820-7848) or CMS Research personnel (Dr. Gary D. Sides or Mr. Thomas G. Thomas, 205-733-6900) immediately if they experience any problems in the operation of the MINICAMS or associated equipment. If they have questions concerning the application of MINICAMS to the

determination of CW agents at any of the sites or if they obtain positive readings where none are expected, they should immediately telephone CMS Research personnel (Dr. Sides or Mr. Thomas).

Please note that MINICAMS-based monitoring systems are capable of much more powerful and sophisticated applications than planned for the site investigations at Ft. McClellan. However, the recommendations presented here are based on the technical skills and experience of TEU staff in using automated low-level monitors and on the monitoring needs at the various sites. Thus, our recommendations are relatively conservative with respect to sample time, operating procedures, etc. TEU staff are obviously quite capable. Thus, we anticipate that they will be able to perform more sophisticated monitoring tasks using MINICAMS in the future. Nonetheless, we believe that the first application of of this technology by TEU personnel should be as simple as possible to ensure completing their mission.

The remainder of the recommendations presented here address the setup of the MINICAMS from a cold start (for example, on Monday morning), preventive maintenance, precalibration checks, calibration procedures, routine challenges to check the operation of the MINICAMS, and the standby mode of operation.

SETUP OF THE MINICAMS

Some general recommendations concerning the setup and operation of the MINICAMS are given below:

- The MINICAMS controller, monitor, floppy disk drive, and printer should be plugged into the line conditioner povided for each system.
- Make sure that a formatted 360K floppy disk is installed in the floppy disk drive and that paper is supplied to the printer.
- Each line conditioner and the two sample pumps should be plugged into outlets wired directly to the 3.5-kW generator.
- The regulators on the air and hydrogen compressed-gas cylinders should be set so that the pressure readings for these gases on the monitor LCD screens read 35 psig.
- After making the specific checks and adjustments for each MINICAMS as described below, make sure that there are no error codes displayed on the screen of each controller.

- During the sample period (indicated by SAM on the third line of the LCD MAIN page), use a rotameter to make sure that the sample flow rate is in the range of 900-1100 mL/min.

- Set the station number on the UTILITIES page of the controller to agree with the number of the site being monitored.

Specific additional recommendations for each of the two MINICAMS are presented below.

S/N 1361 (HD MINICAMS)

- Install a new preconcentrator tube (long Tenax-GC tube--with granular particles) in the monitor, and wait about 20-30 min before calibrating the monitor to ensure stable operation. Note that the preconcentrator tube may be used continuously for 5 days. Thus, a new tube should be installed only on Monday morning or when you suspect severe contamination.

- Make sure that a fitting with a clean dust filter is mounted on the end of the sampling line attached to the MINICAMS and that this fitting is located inside a small, vented plastic container, which will be used to shield the end of the sample line from direct contact with dirt when the line is inserted into sampling holes drilled at each of the 12 sites. (Note that the plastic container will be removed during the calibration of the MINICAMS.)

- Make sure that the setpoints for the operating parameters for the MINICAMS are as shown in Table 1. Note that the agent gate may be set differently than shown in the table.

- If you do not think that the parameters are set correctly, then adjust the parameters as necessary using the pushbuttons on the front of the MINICAMS controller or, alternatively, use the download floppy disk labelled "HD/FSA S/N 1361" to reload the correct operating parameters. After downloading operating parameters to the controller, set the station number on the UTILITIES page to agree with the number of the site being monitored.

- Adjust the regulator on the nitrogen cylinder until the pressure reading on the controller connected to MINICAMS monitor S/N 1361 is 20 psig.

S/N 1587 (GB/VX MINICAMS)

- Install a new preconcentrator tube (short HayeSep D tube--with smooth, round particles) in the monitor, and wait about 20-30 min before calibrating the monitor to ensure stable operation. Note that the preconcentrator tube may be used continuously for 5 days. Thus, a new tube should be installed only on Monday morning or when you suspect severe contamination of the tube.

- Make sure that a fitting with a clean dust filter is mounted on the end of the sampling line attached to the MINICAMS and that this fitting is located inside a small, vented plastic container, which will be used to shield the end of the sample line from direct contact with dirt when the line is inserted into sampling holes drilled at each of the 12 sites.

- Make sure that a fitting with a clean dust filter and a V-to-G filter is mounted on the end of the sampling line attached to the MINICAMS and that this fitting is located inside a small, vented plastic container, which will be used to shield the end of the sample line from direct contact with dirt when the line is inserted into sampling holes drilled at each of the 12 sites. (Note that the plastic container will be removed during the calibration of the MINICAMS.)

- Note that the V-to-G conversion filter and backup pad should be changed aproximately once every 4-5 hours of operation. Also, the MINICAMS should recalibrated about 20-30 min after replacing the V-to-G filter and backup pad.

- Make sure that the setpoints for the operating parameters for the MINICAMS are as shown in Table 2. Note that the agent gates may be set differently than shown in the table.

- If you do not think that the parameters are set correctly, then adjust the parameters as necessary using the pushbuttons on the front of the MINICAMS controller or, alternatively, use the download floppy disk labelled "GB/VX FMA S/N 1687" to reload the correct operating parameters. After downloading operating parameters to the controller, set the station number on the UTILITIES page to agree with the number of the site being monitored.

- Adjust the regulator on the nitrogen cylinder until the pressure reading on the controller connected to MINICAMS monitor S/N 1587 is 40 psig.

- If you plan to monitor for GB and VX, make sure that an asterisk (*) appears beside each of these agent names on the AGENTS screen of the LCD on the controller attached to MINICAMS monitor S/N 1587.

- If you plan to monitor for GB only, make sure that an asterisk (*) appears only beside GB on the AGENTS screen.

CALIBRATION PROCEDURES

The calibration procedures for the two MINICAMS used during the site investigations at Ft. McClellan are presented below.

S/N 1361 (HD MINICAMS)

After completing the general and specific steps given above for MINICAMS S/N 1361 (see SETUP OF MINICAMS), complete the following steps to calibrate the monitor for agent HD:

- Press the PARAM pushbutton until CAL is blinking on the MAIN page.

- When the word INJECT is blinking, inject 3 uL of the 3-ng/uL HD standard onto the center of the dust filter attached to the end of the sampling line connected to the MINICAMS inlet.*

- At the end of the next agent gate (after the HD result is reported), press the ENTER pushbutton to save the calibration result in the MINICAMS memory. The reading on the top line of the LCD should now be 1.00 TWA.

- When the word INJECT is again blinking, inject 3 uL of the3-ng/uL HD standard onto the center of the dust filter attached to the end of the sampling line connected to the MINICAMS inlet.

- At the end of the next agent gate (after the HD result is reported), the reading on the top line of the LCD should now be in the range of 0.80 to 1.20 TWA. If the reading falls within this range, press the ENTER pushbutton to save the result of the second calibration injection. Next, press the PARAM pushbutton to end the calibration.

*The 3-uL injection is based on a 3-min MINICAMS sample period at a sample flow rate of 1000 mL/min and the definition of the 8-hr TWA concentration for HD (3 ng/L). The volume injected has to be adjusted if any of these assumptions are not correct.

- If the reading after the second calibration injection does not fall within the range of 0.80 to 1.20 TWA, then do not save the calibration result (that is, don't press the ENTER pushbutton). Instead, make a third injection and save the result if it is in the range of 0.80 to 1.20 TWA.

- If the third injection does not fall in the range of 0.80 to 1.20 TWA, then exit the calibration by pressing the PARAM pushbutton. Next, return to the first step above and attempt to recalibrate the MINICAMS.

- After completing the calibration of the MINICAMS, press the PRINT pushbutton to print all of the operating parameters on the dot-matrix printer and to output them to the floppy disk.

S/N 1587 (GB MINICAMS)

After completing the general and specific steps given above for MINICAMS S/N 1587 (see SETUP OF MINICAMS), complete the following steps to calibrate the monitor for agent GB only:

- Set the total cycle time to 360 sec (6 min).

- Deselect VX and select GB on the agents screen.

- Note that only a dust filter is required when monitoring for GB only. No V-to-G filter is required.
- Press the PARAM pushbutton until CAL is blinking on the MAIN page.

- When the word INJECT is blinking, inject 2 uL of the 0.2-ng/uL GB standard onto the center of the dust filter attached to the end of the sampling line connected to the MINICAMS inlet.*

- At the end of the next agent gate (after the GB result is reported), press the ENTER pushbutton to save the calibration result in the MINICAMS memory. The reading on the top line of the LCD should now be 1.00 TWA.

- When the word INJECT is again blinking, inject 2 uL of the0.2-ng/uL GB standard onto the center of the dust filter attached to the end of the sampling line connected to the MINICAMS inlet.

*The 2-uL injection is based on a 4-min MINICAMS sample period at a sample flow rate of 1000 mL/min and the definition of the 8-hr TWA concentration for GB (0.1 ng/L). The volume injected has to be adjusted if any of these assumptions are not correct.

- At the end of the next agent gate (after the GB result is reported), the reading on the top line of the LCD should now be in the range of 0.80 to 1.20 TWA. If the reading falls within this range, press the ENTER pushbutton to save the result of the second calibration injection. Next, press the PARAM pushbutton to end the calibration.

- If the reading after the second calibration injection does not fall within the range of 0.80 to 1.20 TWA, then do not save the calibration result (that is, don't press the ENTER pushbutton). Instead, make a third injection and save the result if it is in the range of 0.80 to 1.20 TWA.

- If the third injection does not fall in the range of 0.80 to 1.20 TWA, then exit the calibration by pressing the PARAM pushbutton. Next, return to the first step above and attempt to recalibrate the MINICAMS.

- After completing the calibration of the MINICAMS, press the PRINT pushbutton to print all of the operating parameters on the dot-matrix printer and to output them to the floppy disk.

S/N 1587 (GB/VX MINICAMS)

After completing the general and specific steps given above for MINICAMS S/N 1587 (see SETUP OF MINICAMS), complete the following steps to calibrate the monitor simultaneously for agent GB and agent VX:

- Set the total cycle time to 600 sec (10 min).

- A dust filter and a V-to-G filter are required when monitoring for GB and VX simultaneously.

- Press the PARAM pushbutton until CAL is blinking on the MAIN page.

- When the word INJECT is blinking, inject 4 uL of the standard containing 0.2 ng/uL of GB and 0.02 ng/uL of VX onto the center of the V-to-G filter attached to the end of the sampling line connected to the MINICAMS inlet.*

*The 4-uL injection is based on an 8-min MINICAMS sample period, a sample flow rate of 1000 mL/min, and the definitions of the 8-hr TWA concentrations for GB (0.1 ng/L) and VX (0.01 ng/L). The volume injected has to be adjusted if any of these assumptions are not correct.

- At the end of the next GB agent gate (after the GB result is reported), press the ENTER pushbutton to save the calibration result in the MINICAMS memory. The reading on the top line of the LCD should now be 1.00 TWA for GB and for VX.

- When the word INJECT is again blinking, inject 4 uL of the standard onto the center of the V-to-G filter attached to the end of the sampling line connected to the MINICAMS inlet.

- At the end of the next agent gate (after the GB result is reported), the reading on the top line of the LCD should now be in the range of 0.80 to 1.20 TWA for GB and for VX. If the reading falls within this range, press the ENTER pushbutton to save the result of the second calibration injection. Next, press the PARAM pushbutton to end the calibration.

- If the reading after the second calibration injection does not fall within the range of 0.80 to 1.20 TWA for both agents, then do not save the calibration result (that is, don't press the ENTER pushbutton). Instead, make a third injection and save the result if it is in the range of 0.80 to 1.20 TWA.

- If the third injection does not fall in the range of 0.80 to 1.20 TWA, then exit the calibration by pressing the PARAM pushbutton. Next, return to the first step above and attempt to recalibrate the MINICAMS.

- After completing the calibration of the MINICAMS, press the PRINT pushbutton to print all of the operating parameters on the dot-matrix printer and to output them to the floppy disk.

Setting the Agent Gates

Normally the agent gates are set 4-sec wide when monitoring for HD, GB or VX. However, it may be necessary to set the gates to a width of 6 sec to allow for power fluctuations when the MINICAMS are powered from portable generator.

When calibrating the MINICAMS for HD or GB, make sure that the agent peak is captured. After completing the calibration, set the width of the agent gate to 5 sec, centered on the average retention time (T value) reported on the operating parameters printout.

STANDBY MODE OPERATION

At the end of each day, the MINICAMS should not be shut down completely but, instead, should be placed in a standby mode as follows:

- Back the vehicle up to the building where it will be stored for the night.
- Disconnect the line conditioner from the generator power and plug it into an extension cord leading to AC power in the building.
- Turn off the sample pump, the printer, and the floppy disk drive.
- Shut off the air and hydrogen to each MINICAMS. Leave the nitrogen turned on.

TABLE I

04/09/92 ********** MINICAMS OPERATING PARAMETERS ********** 14:46

S/N 1361 — ERROR — STATION 1

HD 1361

TEMPERATURES, °C:	Ambient	s 40!!!	a 0!!!	± 15!!!
	Inlet	s 75!!!	a 0!!!	± 15!!!
	FPD block	s150!!!	a 0!!!	± 15!!!
	FPD flame	s225!!!	a 0!!!	± 50!!!
	Column		a 0	
	Column, low	s 50	a 0	± 15
	Column, high	s200	a 0	± 15
	Column rate, °C/min	s 0.00		
	PCT heater		a 0	
	PCT heater, low	s 40!!!	a 0!!!	± 30!!!
	PCT heater, high	s220	a 0	± 50
PRESSURES, psi:	Air	s 35!!!	a 0!!!	± 5!!!
	Nitrogen	s 20!!!	a 0!!!	± 5!!!
	Hydrogen	s 35!!!	a 0!!!	± 5!!!
SAMPLE:	Flow rate, ccm	s 0	a 0	± 99
	Volume, L		a3.00	

TIMES, sec:	Purge	b 0	e120	Sample	b120	e300
	Desorb	b 0	e 30	Column	b 30	e 90
	Inject	b120	e 140	FPD zero	b 5	e 15
	Inlet	b 0	e300			

VOLTAGE, VDC: FPD photomultiplier s 900!!! a -9!!! ± 99!!!

ELECTROMETER: FPD signal, nA10394.02 FPD zero, nA 0.00

CONCENTRATION REPORT: Alarm setpoint, TWA 0.80

HD 0.00C 0.00H* 0.0A 0.0T 0.0W (b 70 e 90) *

CALIBRATION DATA:

HD 1 FPD 100.00H* 200.0A 61.0T 2.0W 07/07/89 10:14

ERRORS: RPC RIN RCD RFP FLA FPD INL PMT H2P N2P AIR AMB LPC

ELAPSED TIME ********** 3 sec

TABLE 2

Monitor Serial Number 1587 Sampling Station 2

Date	Time	VX	GB	TWA
04/08/92	14:43	0.00	0.00	

FLA FPD H2P N2P ERROR

04/08/92 ********** MINICAMS OPERATING PARAMETERS ********** 14:43

S/N 1587 ERROR STATION 2

TEMPERATURES, °C:	Ambient	s 30	a 28	± 15
	Inlet	s 40	a 41	± 15
	FPD block	s150!!!	a 78!!!	± 15!!!
	FPD flame	s225!!!	a 47!!!	± 50!!!
GBVX1587	Column		a 30	
	Column, low	s 35!!!	a 0!!!	± 15!!!
	Column, high	s150	a 0	± 15
	Column rate, °C/min	s 0	a 0	± 20
	PCT heater		a 26	
	PCT heater, low	s 35!!!	a 0!!!	± 20!!!
	PCT heater, high	s220!!!	a 28!!!	± 50!!!
PRESSURES, psi:	Air	s 35!!!	a 2!!!	± 5!!!
	Nitrogen	s 40!!!	a 2!!!	± 5!!!
	Hydrogen	s 35!!!	a -1!!!	± 5!!!
SAMPLE:	Flow rate, ccm	s 0	a 0	± 99
	Volume, L		a8.00	

TIMES, sec:	Purge	b 0	e120	Sample	b120	e600
	Desorb	b 5	e 30	Column	b 30	e 90
	Inject	b120	e140	Inlet	b 0	e600
	FPD zero	b 5	e 20			

VOLTAGE, VDC: FPD photomultiplier s1200 a1187 ± 50

ELECTROMETER: FPD signal, nA 0.00 FPD zero, nA 6.94

CONCENTRATION REPORTS: Alarm setpoint, TWA 0.80

VX	0.00C	0.00H*	0.0A	0.0T	0.0W	b 64	e 69
GB	0.00C	0.00H*	0.0A	0.0T	0.0W	b 69	e 74

CALIBRATION DATA:

VX 1	FPD	~~10~~ 50 .00H*	48.7A	49.5T	1.7W	12/14/90	08:56
GB 1	FPD	~~10~~ 250 .00H*	556.6A	53.7T	1.6W	12/14/90	08:56

ERRORS: FLA FPD H2P N2P AIR LCO LPC HPC

ELAPSED TIME ********** 80 sec