



DEPARTMENT OF THE ARMY
US ARMY PUBLIC HEALTH COMMAND (PROVISIONAL)
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MD 21010-5403

MCHB-TS-RDE

10 APR 2010

MEMORANDUM FOR Office of the Command Surgeon (LTC (b) (6)),
US Central Command, 7115 South Boundary Boulevard, MacDill Air Force Base,
FL 33621-5101

SUBJECT: Deployment Occupational and Environmental Health Risk Characterization,
Ambient Air Volatile Organic Compound Samples, Bullard, Afghanistan,
16 and 17 January 2010, U_AFG_BULLARD_CM_A17_20100117

1. The enclosed report details the occupational and environmental health (OEH) risk characterization for four valid ambient air volatile organic compound (VOC) samples collected by 180th Medical Detachment personnel from Bullard, Afghanistan, 16 and 17 January 2010.
2. None of the VOCs detected in the samples were present at concentrations greater than their respective military exposure guidelines. The OEH risk estimate for exposure to VOCs in the ambient air at Bullard, Afghanistan is **low**. Exposure to the ambient air at the sampled site is expected to have little or no impact on unit readiness.

FOR THE COMMANDER:

(b) (6)

Encl

Director, Health Risk Management

CF: (w/encl)

180th MED DET (Commander/MAJ (b) (6))
JSC-A (Environmental Science Officer/LT (b) (6))
30th MEDCOM (Liaison Officer/LTC (b) (6))
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PHCR-Europe (MCHB-AE-EE/CPT (b) (6))

U.S. Army Public Health Command (Provisional)

DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL
HEALTH RISK CHARACTERIZATION
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
BULLARD, AFGHANISTAN
16 AND 17 JANUARY 2010
U_AFG_BULLARD_A17_20100117

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Base, FL 33621-5101.

Preventive Medicine Survey: 40-5f1

PHC FORM 433-E (MCHB-CS-IP), NOV 09

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DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL
HEALTH RISK CHARACTERIZATION
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
BULLARD, AFGHANISTAN
16 AND 17 JANUARY 2010
U_AFG_BULLARD_CM_A17_20100117

1. REFERENCES. See Appendix A for references.

2. PURPOSE. According to U.S. Department of Defense medical surveillance requirements, this occupational and environmental health (OEH) risk characterization documents the identification and assessment of chemical hazards that pose potential health and operational risks to deployed troops. Specifically, the samples and information provided on the associated field data sheets were used to estimate the operational health risk associated with exposure to identified chemical hazards in the air at Bullard, Afghanistan.

3. SCOPE. This assessment addresses the analytical results of four valid ambient air volatile organic compound (VOCs) samples collected from Bullard, Afghanistan, 16 and 17 January 2010. These samples are limited in time, area, and media. Therefore, this report should not be considered a complete assessment of the overall OEH hazards to which troops may be exposed at this location. However, this assessment has been performed using operational risk management (ORM) doctrine Field Manual (FM) 5-19 and the relatively conservative (protective) assumptions and methods provided in the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Technical Guide (TG) 230 to facilitate decision making that can minimize the likelihood of significant risks.

4. BACKGROUND AND EXPOSURE ASSUMPTIONS. The samples were collected to assess the potential for adverse health effects to troops routinely and continuously breathing the ambient air at Bullard, Afghanistan. The samples were collected at the storage area near the burn pit and at the base of an unmanned guard tower. It is expected that all of the personnel will be exposed to the ambient air for deployment durations of less than 1 year. No adverse weather conditions were reported. In addition, it is assumed that control measures and/or personal protective equipment are not used.

5. METHOD. The U.S. Army Public Health Command (Provisional) (USAPHC (Prov)), formerly USACHPPM, Deployment Environmental Surveillance Program uses the USACHPPM TG 230 methodology and associated military exposure guidelines (MEGs) to assess identified hazards and estimate risk in a manner consistent with doctrinal risk

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management procedures and terminology. This method includes identification of the hazard(s), assessment of the hazard severity and probability, determination of a risk estimate, and associated level of confidence. As part of the hazard identification step, the long-term (1-year) MEGs are used as screening criteria to identify those hazards that are potential health threats. These 1-year MEGs represent exposure concentrations at or below which no significant health effects (including delayed or chronic disease or significant increased risk of cancer) are anticipated even after 1 year of continuous daily exposures. Short-term MEGs are used to assess one time or intermittent exposures. The underlying toxicological basis for the MEGs is addressed in the USACHPPM Reference Document (RD) 230. Since toxicological information about potential health effects varies among different chemicals, the determination of severity of effects when MEGs are exceeded involves professional judgment. Hazards with exposure concentrations greater than MEGs are identified as potential health threats, carried through the hazard assessment process, and assigned a risk estimate consistent with ORM methodology. Hazards that are either not detected or are present only at levels below the 1-year MEGs are not considered health threats and, therefore, are automatically assigned a low operational risk estimate.

6. HAZARD IDENTIFICATION.

a. Sample Information. Four ambient air VOC samples collected with the Deployable Volatile Sampler (DVS) were submitted for analysis. The four samples were collected on 16 and 17 January 2010. (DVS is a trademark of SKC, Inc.)

b. Laboratory Analysis. Four samples were analyzed by the USAPHC (Prov) laboratory for VOCs. Concentrations of VOCs detected above the laboratory reporting limit were compared to MEGs presented in USACHPPM TG 230. Appendix B provides a summary of the samples assessed in this report. Appendix C contains a summary of the sample results. Appendix D presents detailed laboratory results.

c. Risk Estimate. None of the VOCs detected in the samples were present at concentrations greater than their respective MEGs. Therefore, no potential health threats were identified and the risk estimate for exposure to VOCs in the ambient air is considered **low**.

7. CONCLUSION. The OEH risk estimate for exposure to VOCs in the ambient air at Bullard, Afghanistan is **low**. Exposure to VOCs in the ambient air at the sampled site is expected to have little or no impact on unit readiness. Using USACHPPM TG 230, Table 3-5 as a guide, confidence in the risk estimate is considered low. In general, the confidence level in risk estimates is usually low to medium due to consistent lack of specific exposure information associated with troop movement and activity patterns;

other routes/sources of potential OEH hazards not identified; and uncertainty regarding impacts of multiple chemicals present, particularly those affecting the same body organs/systems.

8. RECOMMENDATION AND NOTES.

a. Recommendation. Continue to collect samples from Bullard, Afghanistan at least once every 6 days for the deployment duration (or as long as possible) to better characterize VOC concentrations in the ambient air to which personnel are typically exposed, and to increase confidence in risk estimates at this location.

b. Notes.

(1) This OEH risk assessment is specific to the exposure assumptions identified above and the sample results assessed in this report. If the assumed exposure scenario changes, provide updated information so that the risk estimate can be reassessed. If additional samples from this location are collected, a new OEH risk assessment will be completed.

(2) As part of a Comprehensive Military Medical Surveillance Program, required by Department of Defense Directive 6490.02E and Department of Defense Instruction 6490.03, this report has been submitted to the Deployment Occupational and Environmental Health Surveillance (DOEHS)-Data Portal. You can view this and other archived DOEHS data at <https://doehsportal.apgea.army.mil/doehrs-oehs/>. If you have additional DOEHS data for Bullard, Afghanistan it can also be submitted via this Web site.

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard, Afghanistan, 16 and 17 Jan 10, U_AFG_BULLARD_CM_A17_20100117

9. POINTS OF CONTACT. The USAPHC (Prov) points of contact for this assessment are Ms. (b) (6) and Mr. (b) (6). Ms. (b) (6) may be contacted at e-mail (b) (6); Mr. (b) (6) may be contacted at e-mail (b) (6) or DSN (b) (6) or commercial (b) (6).

(b) (6)

Environmental Scientist
Deployment Environmental Surveillance
Program

Approved by:

(b) (6)

MAJ, MS
Program Manager
Deployment Environmental Surveillance

APPENDIX A

REFERENCES

1. Department of Defense Directive (DODD) 6490.02E, Comprehensive Health Surveillance, 21 October 2004.
2. Department of Defense Instruction (DODI) 6490.03, Deployment Health, 11 August 2006.
3. Department of the Army, Field Manual (FM) 5-19, Composite Risk Management, 21 August 2006.
4. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Technical Guide (TG) 230, Chemical Exposure Guidelines for Deployed Military Personnel, Version 1.3, May 2003 with the January 2004 addendum.
5. Memorandum, USACHPPM (MCHB-TS-RDE), 27 April 2007, Subject: Deployment Operational Risk Characterization Method for Particulate Matter.

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard, Afghanistan, 16 and 17 Jan 10,
U_AFG_BULLARD_CM_A17_20100117

APPENDIX B

INFORMATION SUMMARY
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
BULLARD, AFGHANISTAN
16 AND 17 JANUARY 2010

DOEHRS Sample ID	Field/Local Sample ID	Site	Start Date/Time	Sample Duration
00001ZBL	AFGBULLAR10016TO17	Storage area near burn pit	2010/01/16 0949	480.0 minutes
00001ZBN	AFGBULLAR10016TO17	Storage area near burn pit	2010/01/16 0948	480.0 minutes
00001ZBO	AFGBULLAR10017TO17	Guard tower	2010/01/17 0930	420.0 minutes
00001ZBQ	AFGBULLAR10017TO17	Guard tower	2010/01/17 0930	420.0 minutes

LEGEND:

DOEHRS Sample ID = Deployment Occupational and Environmental Health Readiness System Sample Identification Number

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard, Afghanistan,
16 and 17 Jan 10, U_AFG_BULLARD_CM_A17_20100117

APPENDIX C

SAMPLE RESULTS SUMMARY
 AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
 BULLARD, AFGHANISTAN
 16 AND 17 JANUARY 2010

Parameter	Units	Concentration		Valid Samples		USACHPPM TG 230 Military Exposure Guidelines	
		Maximum	Average	#	# > Laboratory Reporting Limit	1-year	
						# > MEG	MEG
1,2,4-Trimethylbenzene	µg/m ³	1.2997	1.0291	4	4	0	3100
Benzene	µg/m ³	1.8229	1.0311	4	2	0	39
Cyclohexane	µg/m ³	0.8316	0.5498	4	2	0	4100
Decane	µg/m ³	4.8444	3.4559	4	4	No MEG	
Hexane	µg/m ³	0.98958	0.91903	4	4	0	4300
m,p-Xylene	µg/m ³	1.0634	0.95079	4	4	No MEG	
o-Xylene	µg/m ³	0.59078	0.41561	4	2	0	11000
Styrene	µg/m ³	0.76801	0.49664	4	2	0	2000
Toluene	µg/m ³	1.536	1.3123	4	4	0	4600

LEGEND:
 µg/m³ = micrograms per cubic meter
 TG = technical guide
 MEGs = military exposure guidelines

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard,
Afghanistan, 16 and 17 Jan 10, U_AFG_BULLARD_CM_A17_20100117

APPENDIX D

DETAILED SAMPLE RESULTS
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
BULLARD, AFGHANISTAN
16 AND 17 JANUARY 2010

DOEHRS Sample ID			00001ZBL	00001ZBN	00001ZBO	00001ZBQ
Field/Local Sample ID			AFGBULLAR 10016TO17	AFGBULLAR 10016TO17	AFGBULLAR 10017TO17	AFGBULLAR 10017TO17
Site			Storage area near burn pit	Storage area near burn pit	Guard tower	Guard tower
Start Date			2010/01/16 0949	2010/01/16 0948	2010/01/17 0930	2010/01/17 0930
Parameter	Class	Units	Concentration ^{1,2}			
1,1,1,2-Tetrachloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1,1-Trichloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1,2,2-Tetrachloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1,2-Trichloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1-Dichloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1-Dichloroethene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,1-Dichloropropene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2,3-Trichlorobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2,3-Trichloropropane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2,4-Trichlorobenzene	SVOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2,4-Trimethylbenzene	VOC	µg/m ³	0.9375	0.8316	1.0474	1.2997
1,2-Dibromo-3-chloropropane	VOC	µg/m ³	< 1.3021	< 1.2994	< 1.4547	< 1.4769
1,2-Dibromoethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2-Dichlorobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2-Dichloroethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,2-Dichloropropane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,3,5-Trimethylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,3-Dichlorobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,3-Dichloropropane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
1,4-Dichlorobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
2,2-Dichloropropane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard,
Afghanistan, 16 and 17 Jan 10, U_AFG_BULLARD_CM_A17_20100117

DOEHRS Sample ID			00001ZBL	00001ZBN	00001ZBO	00001ZBQ
Field/Local Sample ID			AFGBULLAR 10016TO17	AFGBULLAR 10016TO17	AFGBULLAR 10017TO17	AFGBULLAR 10017TO17
Site			Storage area near burn pit	Storage area near burn pit	Guard tower	Guard tower
Start Date			2010/01/16 0949	2010/01/16 0948	2010/01/17 0930	2010/01/17 0930
Parameter	Class	Units	Concentration ^{1,2}			
2-Chlorotoluene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
4-Chlorotoluene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
4-Isopropyltoluene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Benzene	VOC	µg/m ³	1.8229	1.7152	< 0.58188	< 0.59078
Bromobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Bromochloromethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Bromodichloromethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Bromoform	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Carbon tetrachloride	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Chlorobenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Chloroform	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Cyclohexane	VOC	µg/m ³	0.78125	0.8316	< 0.58188	< 0.59078
Cyclopentane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Decane	VOC	µg/m ³	2.8125	2.4428	3.7241	4.8444
Dibromochloromethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Dibromomethane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Ethylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Hexachlorobutadiene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Hexane	VOC	µg/m ³	0.98958	0.98753	0.93101	0.76801
Isooctane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Isopropylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Methylcyclopentane	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Methylene chloride	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Styrene	VOC	µg/m ³	< 0.52083	< 0.51975	0.69826	0.76801
Tetrachloroethene {PCE}	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
Toluene	VOC	µg/m ³	1.1979	1.3514	1.1638	1.536
Trichloroethene {TCE}	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
cis-1,2-Dichloroethene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Bullard, Afghanistan, 16 and 17 Jan 10, U_AFG_BULLARD_CM_A17_20100117

DOEHRS Sample ID			00001ZBL	00001ZBN	00001ZBO	00001ZBQ
Field/Local Sample ID			AFGBULLAR 10016TO17	AFGBULLAR 10016TO17	AFGBULLAR 10017TO17	AFGBULLAR 10017TO17
Site			Storage area near burn pit	Storage area near burn pit	Guard tower	Guard tower
Start Date			2010/01/16 0949	2010/01/16 0948	2010/01/17 0930	2010/01/17 0930
Parameter	Class	Units	Concentration ^{1,2}			
cis-1,3-Dichloropropene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
m,p-Xylene	VOC	µg/m ³	0.98958	0.93555	0.81464	1.0634
n-Butylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
n-Propylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
o-Xylene	VOC	µg/m ³	0.52083	< 0.51975	< 0.58188	0.59078
sec-Butylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
tert-Butylbenzene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
trans-1,2-Dichloroethene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078
trans-1,3-Dichloropropene	VOC	µg/m ³	< 0.52083	< 0.51975	< 0.58188	< 0.59078

¹< X.XX = Below laboratory reporting limit (X.XX)

²Laboratory reporting limit is parameter and sample specific

LEGEND:

DOEHRS Sample ID = Deployment Occupational and Environmental Health Readiness System Sample Identification Number

µg/m³ = micrograms per cubic meter

VOC = volatile organic compound

SVOC = semivolatle organic compound