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

16 DEC 2009

MCHB-TS-RDE

MEMORANDUM FOR Office of the Command Surgeon (MAJ (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, Speicher, Iraq, 19–22 October 2009, U_IRQ_SPEICHER_CM_A17_20091022

1. The enclosed report details the occupational and environmental health (OEH) risk characterization for eight valid ambient air volatile organic compound (VOC) samples collected by 223rd Medical Detachment personnel from Speicher, Iraq, 19-22 October 2009.

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 around the burn pit at Speicher, Iraq 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)

Director, Health Risk Management

Encl

CF: (w/encl)
223rd MED DET (Commander/CPT (b) (6)
223rd MED DET (Detachment Sergeant/SFC (b) (6)
223rd MED DET (CPT (b) (6)
223rd MED DET (SSG (b)
61st MED DET (Commander/CPT (b) (6)
61st MED DET (XO/CPT (b) (6)
61st MED DET (SGT (b) (6)
61st MED DET (PFC (b) (6)
MNC-I (Command Surgeon Office/LTC (b) (6)
MNF-I CJ148 (Commander/CDR (b) (6)
ARCENT (Command Surgeon Office/LTC (b) (6)
ARCENT (Force Health Protection Officer/LTC (b) (6)
CFLCC/USA 3RD MDSC (MAJ (b) (6)
(CONT)

MCHB-TS-RDE
SUBJECT: Deployment Occupational and Environmental Health Risk Characterization, Ambient Air Volatile Organic Compound Samples, Speicher, Iraq, 19-22 October 2009, U_IRQ_SPEICHER_CM_A17_20091022

CF: (w/encl) (CONT)
1st MED BDE (Environmental Science Officer/SFC [redacted]
1st MED BDE (Environmental Science Officer/MSG [redacted]
1st MED BDE (Environmental Science Officer/CPT [redacted]
61st MMB (Preventive Medicine OIC/CPT [redacted]
61st MMB (Preventive Medicine NCO/SSG [redacted]
118th MMB (FHP ESO/Maj [redacted]
USAPHC-EUR (MCHB-AE-EE/CPT [redacted]

U.S. Army Public Health Command
(Provisional)

USAPHC

DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL
HEALTH RISK CHARACTERIZATION
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
19–22 OCTOBER 2009
U_IRQ_SPEICHER_CM_A17_20091022

Preventive Medicine Survey: 40-5f1

DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL
HEALTH RISK CHARACTERIZATION
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
19–22 OCTOBER 2009
U_IRQ_SPEICHER_CM_A17_20091022

1. REFERENCES.

a. Department of the Army, Field Manual (FM) 5-19, Composite Risk Management, 21 August 2006.

b. 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.

c. USACHPPM Reference Document (RD) 230, Chemical Exposure Guidelines for Deployed Military Personnel, Version 1.3, May 2003 with January 2004 addendum.

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 Speicher, Iraq.

3. SCOPE. This assessment addresses the analytical results of eight valid ambient air volatile organic compound (VOCs) samples collected from Speicher, Iraq, 19-22 October 2009. 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 Speicher, Iraq. However, this assessment has been performed using operational risk management (ORM) doctrine FM 5-19, and the relatively conservative (protective) assumptions and methods provided in 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 Speicher, Iraq. The samples were collected around the burn pit/Defense Reutilization and Management Office (DRMO). It is expected that all of the personnel will be exposed to the ambient air for deployment durations of

approximately 1-year. Soldiers are exposed to fumes from the burn pit where they eat, sleep, and work on a daily basis. In addition, it is assumed that control measures and/or personal protective equipment are not used.

5. METHOD. The United States Army Public Health Command (USAPHC) Deployment Environmental Surveillance Program uses the TG 230 methodology and associated military exposure guidelines (MEGs) to assess identified hazards and estimate risk in a manner consistent with doctrinal risk management procedures and terminology. This method includes identification of the hazard(s), assessment of the hazard severity and probability, and 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 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. Nine ambient air VOC samples collected with the Deployment Volatile Sampler were submitted for analysis. The six samples were collected 19–22 October 2009. One sample was invalid due to battery failure.

b. Laboratory Analysis. The eight samples were analyzed by the USAPHC-Headquarters laboratory for VOCs. Concentrations of VOCs detected above the laboratory reporting limit were compared to MEGs presented in TG 230. Appendix A provides a summary of the samples assessed in this report. Appendix B contains a summary of the sample results. Appendices C and D present 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 around the burn pit/DRMO at Speicher, Iraq is **low**. Exposure to VOCs in the ambient air at the sample sites is expected to have little or no impact on unit readiness. Using 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 Speicher, Iraq 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 Speicher, Iraq.

b. Notes.

(1) This OEH risk assessment is specific to the exposure assumptions identified in this report 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 (DoDD) 6490.02E and Department of Defense Instruction (DoDI) 6490.03, this report has been submitted to the Deployment Occupational and Environmental Health Surveillance-Data Portal (DOEHS-DP). You can view this and other archived DOEHS data at https://doehsportal.apgea.army.mil/doehrs-oehs/. If you have additional DOEHS data for this location it can also be submitted via this Web site.

9. POINTS OF CONTACT. The USAPHC 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

INFORMATION SUMMARY
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
19–22 OCTOBER 2009

DOEHRS Sample ID	Field/Local Sample ID	Site	Start Date/Time	Sample Duration	Sample Tube ID
00001FI9	IRA SPEICH 09292 TO17 01	Between DRMO and Burn Pit	2009/10/19 1350	430.0 minutes	C3261
00001FIT	IRA SPEICH 09292 TO17 02	Between DRMO and Burn Pit	2009/10/19 2153	492.0 minutes	C5710
00001FMZ	IRA SPEICH 09293 TO17 04	Between DRMO and Burn Pit	2009/10/20 1525	481.0 minutes	C5797
00001FNI	IRA SPEICH 09293 TO17 05	Between DRMO and Burn Pit	2009/10/20 2327	526.0 minutes	C4733
00001FNM	IRA SPEICH 09293 TO17 06	Between DRMO and Burn Pit	2009/10/21 0817	478.0 minutes	C4807
00001FNT	IRA SPEICH 09293 TO17 07	Between DRMO and Burn Pit	2009/10/21 1616	480.0 minutes	C5356
00001FNX	IRA SPEICH 09294 TO17 09	Between DRMO and Burn Pit	2009/10/22 0820	476.0 minutes	C5181
00001FOA	IRA SPEICH 09294 TO17 08	Between DRMO and Burn Pit	2009/10/22 0018	481.0 minutes	C5279

LEGEND:
DOEHRS Sample ID = Deployment Occupational and Environmental Health Readiness System Sample Identification Number
DRMO = Defense Reutilization and Management Office

APPENDIX B

RESULTS SUMMARY
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
19–22 OCTOBER 2009

Parameter	Units	Concentration[1]		Samples (Valid)		USACHPPM TG230 Military Exposure Guidelines (MEG) 1 year	
		Maximum	Average	#	# > Laboratory Reporting Limit	# > MEG	MEG
1,1-Dichloroethene	µg/m^3	1.3877	0.40269	8	1	0	96
1,2,4-Trimethylbenzene	µg/m^3	2.1837	1.0358	8	5	0	3100
1,3,5-Trimethylbenzene	µg/m^3	0.63912	0.31197	8	1	0	3100
Benzene	µg/m^3	2.7518	1.3758	8	7	0	39
Chlorobenzene	µg/m^3	1.0138	0.41974	8	2	0	400
Cyclohexane	µg/m^3	1.1717	0.531	8	4	0	4100
Cyclopentane	µg/m^3	5.3196	1.274	8	5	0	42000
Decane	µg/m^3	6.9238	2.5548	8	6	No MEG	
Ethylbenzene	µg/m^3	1.619	0.69826	8	5	0	3000
Hexane	µg/m^3	7.989	3.159	8	6	0	4300
Isooctane	µg/m^3	4.9321	1.4871	8	5	No MEG	
m,p-Xylene	µg/m^3	3.3554	1.7869	8	6	No MEG	
Methylcyclopentane	µg/m^3	1.3848	0.59881	8	4	No MEG	
Methylene chloride	µg/m^3	14.966	3.8975	8	5	0	2100

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Speicher, Iraq,
19–22 Oct 09, U_IRQ_SPEICHER_CM_A17_20091022

Parameter	Units	Concentration[1]		Samples (Valid)		USACHPPM TG230 Military Exposure Guidelines (MEG) 1 year	
		Maximum	Average	#	# > Laboratory Reporting Limit	# > MEG	MEG
o-Xylene	µg/m^3	1.5978	0.84874	8	5	0	11000
Styrene	µg/m^3	1.619	0.46781	8	2	0	2000
Toluene	µg/m^3	5.7822	2.6211	8	6	0	4600

[1] Where parameters are not detected in a sample during analyses, half of the laboratory reportable limit is used in the average

LEGEND:
µg/m^3 = micrograms per cubic meter

APPENDIX C

ANALYTICAL SAMPLE RESULTS
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
19–20 OCTOBER 2009

DOEHRS Sample ID		00001FI9	00001FIT	00001FMZ	00001FNI
Field/Local Sample ID		IRA SPEICH 09292 TO17 01	IRA SPEICH 09292 TO17 02	IRA SPEICH 09293 TO17 04	IRA SPEICH 09293 TO17 05
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/19 1350	2009/10/19 2153	2009/10/20 1525	2009/10/20 2327
Parameter	Units	Concentration[1,2]			
1,1,1,2-Tetrachloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,1,1-Trichloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,1,2,2-Tetrachloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,1,2-Trichloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,1-Dichloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,1-Dichloroethene	µg/m^3	1.3877	< 0.51837	< 0.53610	< 0.48277
1,1-Dichloropropene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2,3-Trichlorobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2,3-Trichloropropane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2,4-Trichlorobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2,4-Trimethylbenzene	µg/m^3	2.0816	< 0.51837	0.91137	< 0.48277
1,2-Dibromo-3-chloropropane	µg/m^3	< 1.4455	< 1.2959	< 1.3403	< 1.2069
1,2-Dibromoethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2-Dichlorobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2-Dichloroethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,2-Dichloropropane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,3,5-Trimethylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,3-Dichlorobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,3-Dichloropropane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
1,4-Dichlorobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
2,2-Dichloropropane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
2-Chlorotoluene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
4-Chlorotoluene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Speicher, Iraq, 19–22 Oct 09, U_IRQ_SPEICHER_CM_A17_20091022

DOEHRS Sample ID		00001FI9	00001FIT	00001FMZ	00001FNI
Field/Local Sample ID		IRA SPEICH 09292 TO17 01	IRA SPEICH 09292 TO17 02	IRA SPEICH 09293 TO17 04	IRA SPEICH 09293 TO17 05
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/19 1350	2009/10/19 2153	2009/10/20 1525	2009/10/20 2327
Parameter	Units	Concentration[1,2]			
4-Isopropyltoluene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Benzene	µg/m^3	0.57822	< 0.51837	1.0186	2.7518
Bromobenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Bromochloromethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Bromodichloromethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Bromoform	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Carbon tetrachloride	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Chlorobenzene	µg/m^3	0.75168	< 0.51837	< 0.53610	1.0138
Chloroform	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
cis-1,2-Dichloroethene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
cis-1,3-Dichloropropene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Cyclohexane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	0.82071
Cyclopentane	µg/m^3	5.3196	< 0.51837	1.5011	1.3035
Decane	µg/m^3	2.255	< 0.51837	2.198	1.4483
Dibromochloromethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Dibromomethane	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Ethylbenzene	µg/m^3	1.619	< 0.51837	0.69693	< 0.48277
Hexachlorobutadiene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Hexane	µg/m^3	2.9489	< 0.51837	3.8599	0.82071
Isooctane	µg/m^3	< 0.57822	0.9849	4.9321	3.138
Isopropylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
m,p-Xylene	µg/m^3	3.3536	< 0.51837	2.0908	0.86898
Methylcyclopentane	µg/m^3	< 0.57822	< 0.51837	0.69693	< 0.48277
Methylene chloride	µg/m^3	8.6732	< 0.51837	0.91137	14.966
n-Butylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
n-Propylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
o-Xylene	µg/m^3	1.3299	< 0.51837	0.96498	< 0.48277
sec-Butylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Styrene	µg/m^3	1.619	< 0.51837	< 0.53610	0.53104
tert-Butylbenzene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Speicher, Iraq, 19–22 Oct 09, U_IRQ_SPEICHER_CM_A17_20091022

DOEHRS Sample ID		00001FI9	00001FIT	00001FMZ	00001FNI
Field/Local Sample ID		IRA SPEICH 09292 TO17 01	IRA SPEICH 09292 TO17 02	IRA SPEICH 09293 TO17 04	IRA SPEICH 09293 TO17 05
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/19 1350	2009/10/19 2153	2009/10/20 1525	2009/10/20 2327
Parameter	Units	Concentration[1,2]			
Tetrachloroethene (PCE)	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Toluene	µg/m^3	5.7822	< 0.51837	3.5919	2.1242
trans-1,2-Dichloroethene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
trans-1,3-Dichloropropene	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277
Trichloroethene (TCE)	µg/m^3	< 0.57822	< 0.51837	< 0.53610	< 0.48277

[1]< X.XX = Below laboratory reporting limit (X.XX)
[2]Laboratory reporting limit is parameter and sample specific

LEGEND:
DOEHRS Sample ID = Deployment Occupational and Environmental Health Readiness System Sample Identification Number
DRMO = Defense Reutilization and Management Office
µg/m^3 = micrograms per cubic meter

APPENDIX D

ANALYTICAL SAMPLE RESULTS
AMBIENT AIR VOLATILE ORGANIC COMPOUND SAMPLES
SPEICHER, IRAQ
21–22 OCTOBER 2009

DOEHRS Sample ID		00001FNM	00001FNT	00001FNX	00001FOA
Field/Local Sample ID		IRA SPEICH 09293 TO17 06	IRA SPEICH 09293 TO17 07	IRA SPEICH 09294 TO17 09	IRA SPEICH 09294 TO17 08
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/21 0817	2009/10/21 1616	2009/10/22 0820	2009/10/22 0018
Parameter	Units	Concentration[1,2]			
1,1,1,2-Tetrachloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1,1-Trichloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1,2,2-Tetrachloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1,2-Trichloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1-Dichloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1-Dichloroethene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,1-Dichloropropene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2,3-Trichlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2,3-Trichloropropane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2,4-Trichlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2,4-Trimethylbenzene	µg/m^3	0.91368	1.4304	< 0.53058	2.1837
1,2-Dibromo-3-chloropropane	µg/m^3	< 1.3436	< 1.3244	< 1.3265	< 1.3315
1,2-Dibromoethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2-Dichlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2-Dichloroethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,2-Dichloropropane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,3,5-Trimethylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	0.63912
1,3-Dichlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,3-Dichloropropane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
1,4-Dichlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
2,2-Dichloropropane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
2-Chlorotoluene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
4-Chlorotoluene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Speicher, Iraq, 19–22 Oct 09, U_IRQ_SPEICHER_CM_A17_20091022

DOEHRS Sample ID		00001FNM	00001FNT	00001FNX	00001FOA
Field/Local Sample ID		IRA SPEICH 09293 TO17 06	IRA SPEICH 09293 TO17 07	IRA SPEICH 09294 TO17 09	IRA SPEICH 09294 TO17 08
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/21 0817	2009/10/21 1616	2009/10/22 0820	2009/10/22 0018
Parameter	Units	Concentration[1,2]			
4-Isopropyltoluene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Benzene	µg/m^3	2.0961	1.6423	0.68976	1.9706
Bromobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Bromochloromethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Bromodichloromethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Bromoform	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Carbon tetrachloride	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Chlorobenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Chloroform	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
cis-1,2-Dichloroethene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
cis-1,3-Dichloropropene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Cyclohexane	µg/m^3	0.5912	0.58275	< 0.53058	1.1717
Cyclopentane	µg/m^3	< 0.53746	0.74168	< 0.53058	0.5326
Decane	µg/m^3	3.0098	4.0793	< 0.53058	6.9238
Dibromochloromethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Dibromomethane	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Ethylbenzene	µg/m^3	0.5912	0.79466	< 0.53058	1.1185
Hexachlorobutadiene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Hexane	µg/m^3	4.8909	4.2382	< 0.53058	7.989
Isooctane	µg/m^3	< 0.53746	1.0066	< 0.53058	1.0119
Isopropylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
m,p-Xylene	µg/m^3	1.6124	2.4899	< 0.53058	3.3554
Methylcyclopentane	µg/m^3	0.80619	0.84764	< 0.53058	1.3848
Methylene chloride	µg/m^3	< 0.53746	0.90061	4.9344	< 0.53260
n-Butylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
n-Propylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
o-Xylene	µg/m^3	0.85993	1.2715	< 0.53058	1.5978
sec-Butylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Styrene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
tert-Butylbenzene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Tetrachloroethene (PCE)	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260

Deployment OEH Risk Characterization, Ambient Air VOC Samples, Speicher, Iraq, 19–22 Oct 09, U_IRQ_SPEICHER_CM_A17_20091022

DOEHRS Sample ID		00001FNM	00001FNT	00001FNX	00001FOA
Field/Local Sample ID		IRA SPEICH 09293 TO17 06	IRA SPEICH 09293 TO17 07	IRA SPEICH 09294 TO17 09	IRA SPEICH 09294 TO17 08
Site		Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit	Between DRMO and Burn Pit
Start Date/Time		2009/10/21 0817	2009/10/21 1616	2009/10/22 0820	2009/10/22 0018
Parameter	Units	Concentration[1,2]			
Toluene	µg/m^3	1.7736	3.2316	< 0.53058	3.9412
trans-1,2-Dichloroethene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
trans-1,3-Dichloropropene	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260
Trichloroethene (TCE)	µg/m^3	< 0.53746	< 0.52977	< 0.53058	< 0.53260

[1]< X.XX = Below laboratory reporting limit (X.XX)
[2]Laboratory reporting limit is parameter and sample specific

LEGEND:
DOEHRS Sample ID = Deployment Occupational and Environmental Health Readiness System Sample Identification Number
DRMO = Defense Reutilization and Management Office
µg/m^3 = micrograms per cubic meter