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MCHB-IP-RDE

26 June 2013

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

SUBJECT: Deployment Occupational and Environmental Health Surveillance Sample Report, Airborne Particulate Matter, Tarin Kowt, Afghanistan, 19-20 March 2013, U_AFG_TARINKOWT_IP_A25_20130320

1. The enclosed report details the assessment of 2 particulate matter (PM) air samples collected by 794th Medical Detachment personnel, Tarin Kowt, Afghanistan, 19-20 March 2013. The samples were received at the U.S. Army Public Health Command, Army Institute of Public Health Laboratory on 29 March 2013. Sample analyses were delayed while the weigh chamber was offline from 20 March-25 April 2013.

2. The samples were collected for airborne PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and analyzed for a set of metals typically found in PM. $PM_{2.5}$ was identified as an acute hazard during the assumed exposure timeframe. Based on the samples and associated exposure information assessed in the enclosed report, the tactical risk estimate for $PM_{2.5}$ on both typical and peak exposure days during the sampled timeframe is **low**. No metals were identified as acute hazards.

FOR THE DIRECTOR:

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U.S. ARMY PUBLIC HEALTH COMMAND
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Deployment Occupational and Environmental Health Surveillance Sample Report, U_AFG_TARINKOWT_IP_A25_20130320 Health Risk Management Portfolio

Airborne Particulate Matter, Tarin Kowt, Afghanistan

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ACKNOWLEDGEMENTS

Deployment Occupational and Environmental Health Surveillance Sample Report
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1 References

See Appendix A for a list of references.

2 Purpose

This report provides the U.S. Army Public Health Command (USAPHC), Army Institute of Public Health (AIPH) assessment of the laboratory analytical results and exposure information associated with the samples collected by 794th Medical Detachment personnel on 19-20 March 2013 at Tarin Kowt, Afghanistan according to the U.S. Department of Defense deployment occupational and environmental health (DOEH) surveillance requirements. The assessment serves several purposes. It identifies DOEH hazards that may be related to acute health effects that could occur in personnel during their deployment. It provides an official record of observed exposure conditions for use in future site evaluations. Finally, this report includes preventive steps to reduce or eliminate occupational and environmental exposures and surveillance and/or sampling recommendations, as necessary.

3 Scope

The assessment of sample results and exposure information in this report follows the process published in the USAPHC Technical Guide (TG) 230 “Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel, June 2010 Revision.” The assessment is based on limited data representing a specific time period and assesses short-term exposure risks only. Therefore, this report cannot be used alone to estimate the risk of chronic health effects from exposures. In addition, this assessment does not address all DOEH hazards to which U.S. personnel may be exposed.

4 Laboratory Analysis

Filters used to collect deployment air samples of particulate matter (PM) are shipped to the USAPHC, AIPH and weighed to determine particulate mass and calculate ambient concentrations. The USAPHC, AIPH laboratory also analyzes the PM for a standard set of metals typically found in PM. The complete analytical sample results can be viewed in the Defense Occupational and Environmental Health Readiness System (DOEHRS). Log into the DOEHRS and search for the samples using the DOEHRS sample identification numbers (IDs) provided in Table 1.

Table 1. Sample Identification Information

DOEHRS Sample ID	Sample ID Reported on Field Data Sheet	Sample Site	Date and Time Sample Collected	Sampling Duration	Sample Invalid (Yes/No) Reason for Invalid Sample
00008WG2	AFG_TARINK_20130319_PM2.5DPS	Burn Pit	2013/03/19 1500	1440.0 minutes	No
00008WG1	AFG_TARINK_20130320_PM2.5DPS	Burn Pit	2013/03/20 1600	1440.0 minutes	No

5 Exposure Setting

Table 2 contains information about the sampling location, environmental conditions, and associated potential population exposure. The information was provided on the field data sheets and/or exposure assessment worksheets submitted with the samples unless otherwise noted. Correction and clarification of exposure assumptions by the sampling unit is encouraged.

Table 2. Exposure Information

Questions About Exposure	Information Provided and Assumptions
Why was this sample/sample set collected?	The samples were collected to assess exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location while a new burn pit is being constructed.
What population is exposed and how?	All personnel breathe the ambient air. A platoon-sized element works at the burn pit. The 24 personnel rotate working the burn pit in groups of 6.
What is the timeframe under consideration?	Personnel will work on the new burn pit site for approximately 2 months. Personnel are deployed for approximately 1 year.
Where was the sample/sample set collected?	The samples were collected from the new burn pit construction site.
What is known about location, activity, setting and potential sources of contamination that may affect exposure?	This area is located away from the rest of Tarin Kowt. Soldiers wear masks while working in the burn pit area. There are two active burn pits surrounding this site.

6 Prescreen

Table 3 shows whether parameters are identified as potential hazards because their peak single sample concentrations are greater than their most health-protective screening level in accordance with USAPHC TG 230 military exposure guidelines (MEGs). Potential hazards are further assessed to determine if they are acute hazards. Parameters analyzed but not shown in Table 3 are not considered hazards. The prescreening is conducted as described in USAPHC TG 230, section 3.4.3. The sample results were compared to MEGs on 20 May 2013.

Table 3. Results of Prescreen

Parameter	Detections/ Samples	Peak Sample Concentration (µg/m^3)	1-year Negligible MEG (µg/m^3)	Result
$PM_{2.5}$	2/2	351	15	Retain as potential hazard
Antimony	1/2	0.15893	171.23	Exclude as potential hazard
Lead	1/2	0.10365	12.231	Exclude as potential hazard

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

7 Acute Risk Assessment

7.1 Acute Screen

Table 4 shows whether parameters identified as potential hazards after prescreening are considered acute hazards because their peak sample day concentrations are greater than their acute screening MEGs. Acute hazards are further assessed to estimate the tactical risk from exposure to these parameters in the ambient air. The acute screening is conducted as described in USAPHC TG 230, section 3.4.5.1.

Table 4. Results of Acute Screen

Parameter	Peak Sample Day Concentration (µg/m^3)	Screening MEG (µg/m^3)	Result
$PM_{2.5}$	351	24-Hour Negligible MEG: 65	Retain as acute hazard

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

7.2 Hazard Severity

Table 5 summarizes the hazard severity levels determined by comparing the peak and average sample day concentrations of the acute hazards to the appropriate MEGs. The peak concentration is intended to represent the worst exposure conditions and the average concentration is intended to represent typical exposure conditions. Hazard severity is determined using USAPHC TG 230, section 3.4.5.2.

Table 5. Hazard Severity

Parameter	Concentration (µg/m^3)	Comparison MEGs (µg/m^3)	Hazard Severity
$PM_{2.5}$	Peak: 351	Is ≥ 24-hour Marginal MEG: 250, but < 24-hour Critical MEG: 500	Marginal
	Average: 292	Is ≥ 24-hour Marginal MEG: 250, but < 24-hour Critical MEG: 500	Marginal

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

7.3 Hazard Probability

Table 6 summarizes the hazard probability determinations for each acute hazard. Refer to USAPHC TG 230, section 3.4.5.3 for additional information about hazard probability scoring methodology.

Table 6. Hazard Probability Scoring for $PM_{2.5}$

Concentration ($\mu g/m^3$)	Hazard Probability Scoring for Exposure Factors				Hazard Probability
	Degree of Exposure	Represent-ativeness of Sample Data	Duration of Exposure	Rate of Exposure	
Peak: 351	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimate population exposure.	Score 1: Field exposure duration to MEG exposure duration ratio is <1 (Personnel will not be exposed to the ambient air at this site for 24 continuous hours).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom
Average: 292	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimate population exposure.	Score 1: Field exposure duration to MEG exposure duration ratio is <1 (Personnel will not be exposed to the ambient air at this site for 24 continuous hours).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely

Legend: $\mu g/m^3$ = micrograms per cubic meter

7.4 Tactical Risk Estimate

Table 7 summarizes the acute risk assessment for exposure to each of the acute hazards. The tactical risk estimate was determined using the USAPHC TG 230, Table 3-1 “Military Risk Assessment Matrix.” The tactical risk estimates are color-coded consistent with the black, red, amber, green system described in Department of the Army Field Manual 1-02 "Operational Terms and Graphics."

Table 7. Risk Assessment Summary

Parameter	Type of Exposure	Hazard Severity	Hazard Probability	Tactical Risk Estimate
$PM_{2.5}$	Peak	Marginal	Seldom	Low
	Average	Marginal	Unlikely	Low
Metals	None identified as acute hazards.			

8 Conclusion

Based on the sample results and associated exposure information assessed in this report, the tactical risk estimate for $PM_{2.5}$ on both typical and peak exposure days during the sampled timeframe is **low**. No metals were identified as acute hazards. Refer to USAPHC TG 230, Table 3-2 for the potential consequences to military operations and force readiness associated with this risk level.

9 Limitations

9.1 Field Data Quality

Field data provided with the samples were adequate.

9.2 Sample Receipt at USAPHC Laboratory

The sample set was packaged correctly.

9.3 Laboratory Data Quality

No laboratory data quality issues associated with this sample set were identified.

10 Recommendations and Notes

Maintain communication with USAPHC, AIPH points of contact (POCs) and continue standard surveillance of airborne PM and metals in accordance with defined Occupational and Environmental Health Site Assessment (OEHSA) Exposure Pathways and sampling plans for your location.

An OEHSA was completed for Tarin Kowt, Afghanistan on 5 November 2012. Update the OEHSA annually or as the exposure scenario changes. Collect ambient PM air samples from sites that best represent exposures at least once every 6 days to better characterize conditions over time.

11 Points of Contact

The USAPHC, AIPH POCs for this assessment are Ms. (b) (6) and Ms. (b) (6). Ms. (b) (6) may be contacted at e-mail (b) (6) and Ms. (b) (6) may be contacted at e-mail (b) (6), or DSN (b) (6) or commercial 001-410-436-6096.

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Appendix A

References

Department of Defense. 2004. Department of Defense Directive 6490.02E, *Comprehensive Health Surveillance*. http://www.dtic.mil/whs/directives/corres/pdf/649002Ep.pdf

Department of Defense. 2006. Department of Defense Instruction 6490.03, *Deployment Health*. http://www.dtic.mil/whs/directives/corres/pdf/649003p.pdf

Department of the Army. 2006. Field Manual 5-19, *Composite Risk Management*. https://rdl.train.army.mil/soldierPortal/atia/adlsc/view/public/23137-1/FM/5-19/TOC.HTM

Department of the Army. 2004. Field Manual 1-02, *Operational Terms and Graphics*. https://rdl.train.army.mil/soldierPortal/atia/adlsc/view/public/11444-1/FM/1-02/toc.htm

U.S. Army Public Health Command (Provisional). 2010. Technical Guide 230, *Chemical Exposure Guidelines for Deployed Military Personnel*. http://phc.amedd.army.mil/PHC%20Resource%20Library/TG230.pdf