DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
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MCHB-IP-RDE

1 SEP 2011

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, Azizullah, Afghanistan, 9-10 June 2011, U_AFG_AZIZULLAH_IP_A10_20110610

1. The enclosed report details the assessment of two particulate matter (PM) air samples collected by 10th Mountain Division personnel, Azizullah, Afghanistan, 9-10 June 2011.

2. The sample was collected for airborne PM less than 10 micrometers in diameter (PM_{10}) and analyzed for a set of metals typically found in PM. PM_{10} was identified as an acute hazard during the assumed exposure timeframe. Based on the sample and associated exposure information assessed in the enclosed report, the tactical risk estimate for PM_{10} at the burn pit on 9 June 2011 and the LSA on 10 June 2011 is **moderate**. No metals were identified as acute hazards.

FOR THE DIRECTOR:

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USAPHC
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Deployment Occupational and Environmental Health Surveillance Sample Report, U_AFG_AZIZULLAH_IP_A10_20110610
Health Risk Management Portfolio

Airborne Particulate Matter, Azizullah, Afghanistan

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Preventive Medicine Surveys: 40-5f1

ACKNOWLEDGEMENTS

DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL HEALTH SURVEILLANCE SAMPLE REPORT AIRBORNE PARTICULATE MATTER AZIZULLAH, AFGHANISTAN 9-10 JUNE 2011 U_AFG_AZIZULLAH_IP_A10_20110610

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 10th Mountain Division on 9-10 June 2011 at Azizullah, 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. It identifies whether or not there is a potential for chronic health concerns which may require additional characterization. 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 Provisional (Prov) 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-Environmental Health (DOEHRS-EH). Log into the DOEHRS-EH and search for the samples using the DOEHRS sample identification numbers (IDs) provided in section 5.

5 Exposure Setting

Table 1 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. The samples were identified on the field data sheet as AFG_AZIZULLAH_11159_PM10DPS and AFG_AZIZULLAH_11160_DPS10; the samples are associated with sample IDs 00004I1M and 00004I1N in the DOEHRS-EH. Correction and clarification of exposure assumptions by the sampling unit is encouraged.

Table 1. Exposure Information

Questions About Exposure	Information Provided and Assumptions
Why was this sample/sample set collected?	Routine sampling of ambient air pathway.
What population is exposed and how?	The majority of basecamp personnel are exposed to the ambient air. However, it is assumed that personnel spend part of each day indoors. The majority of U.S. personnel spend a large part of the day in the Life Support Area (LSA) and the very few U.S. personnel exposed at the burn pit do not spend much time there.
What is the timeframe under consideration?	Two 24-hour samples were collected on 9 and 10 June 2011. Although personnel will be deployed to this location for approximately 1 year, only these two days are being assessed.
Where was the sample/sample set collected?	One sample was collected from the LSAalong the main road and the other was collected from the burn pit area.
What is known about location, activity, setting and potential sources of contamination that may affect exposure?	There is no active industry in the area. The burn pit is located upwind from the LSA and was active when sampling ended on 10 June 2011. A dust storm was reported when sampling ended on 11 June 2011.

6 Prescreen

Tables 2 and 3 show whether parameters are identified as potential hazards because their concentrations are greater than their most health-protective screening level USAPHC (Prov) TG 230 military exposure guidelines (MEGs). Potential hazards are further assessed to determine if they are acute hazards. Parameters analyzed but not shown in Tables 2 and 3 are not considered hazards. The prescreening is conducted as described in USAPHC (Prov) TG 230, section 3.4.3. The sample results were compared to MEGs on 3 August 2011.

Table 2. Results of Prescreen-Burn Pit

Parameter	Concentration (µg/m^3)	1-year Negligible MEG (µg/m^3)	Result
PM_{10}	1447	None	Retain as potential hazard
Antimony	0.56944	171	Exclude as potential hazard
Lead	0.11806	12.2	Exclude as potential hazard
Manganese	0.30556	3.42	Exclude as potential hazard
Nickel	0.036111	24.5	Exclude as potential hazard
Zinc	0.48611	489	Exclude as potential hazard

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

Table 3. Results of Prescreen-LSA

Parameter	Concentration (µg/m^3)	1-year Negligible MEG (µg/m^3)	Result
PM_{10}	868	None	Retain as potential hazard
Chromium	0.034722	3.42	Exclude as potential hazard
Manganese	0.61111	3.42	Exclude as potential hazard
Nickel	0.097222	24.5	Exclude as potential hazard

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

7 Acute Risk Assessment

7.1 Acute Screen

Tables 4 and 5 show whether parameters identified as potential hazards after prescreening are considered acute hazards because their 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 (Prov) TG 230, section 3.4.5.1.

Table 4. Results of Acute Screen-Burn Pit

Parameter	Concentration (µg/m^3)	Screening MEG (µg/m^3)	Result
PM_{10}	1447	24-hour Negligible MEG: 250	Retain as acute hazard

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

Table 5. Results of Acute Screen-LSA

Parameter	Concentration (µg/m^3)	Screening MEG (µg/m^3)	Result
PM_{10}	868	24-hour Negligible MEG: 250	Retain as acute hazard

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

7.2 Hazard Severity

Table 6 summarizes the hazard severity levels determined by comparing the concentrations of the acute hazards to the appropriate MEGs. Hazard severity is determined using USAPHC (Prov) TG 230, section 3.4.5.2.

Table 6. Hazard Severity

Parameter	Concentration (µg/m^3)	Comparison MEGs (µg/m^3)	Hazard Severity
PM_{10} at Burn Pit	1447	Is > 24-hour Critical MEG: 600	Critical
PM_{10} at LSA	868	Is > 24-hour Critical MEG: 600	Critical

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

7.3 Hazard Probability

Table 7 summarizes the hazard probability determinations for each acute hazard. Refer to USAPHC (Prov) TG 230, section 3.4.5.3 for additional information about hazard probability scoring methodology.

Table 7. Hazard Probability Scoring for PM_{10}

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	
PM_{10} at Burn Pit: 1447	Score 2: Concentration is >Critical MEG and next higher severity MEG does not exist.	Score 2: Field data adequately estimate population exposure (1 24-hour sample compared to 24-hour 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
PM_{10} at LSA: 868	Score 2: Concentration is >Critical MEG and next higher severity MEG does not exist.	Score 2: Field data adequately estimate population exposure (1 24-hour sample compared to 24-hour 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

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

7.4 Tactical Risk Estimate

Table 8 summarizes the acute risk assessment for exposure to each of the acute hazards. The tactical risk estimate was determined using the USAPHC (Prov) 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 8. Risk Assessment Summary

Parameter	Type of Exposure	Hazard Severity	Hazard Probability	Tactical Risk Estimate
PM_{10} at Burn Pit	Single day	Critical	Seldom	Moderate
PM_{10} at LSA	Single day	Critical	Seldom	Moderate
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_{10} at the burn pit on 9 June 2011 and the LSA on 10 June 2011 is **moderate**. No metals were identified as acute hazards. Refer to USAPHC (Prov) 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 samples were packaged correctly.

9.3 Laboratory Data Quality

No laboratory data quality issues associated with the samples 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.

If an OEHSA and/or specific sampling plans have not yet been completed for Azizullah, Afghanistan, 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 (b) (6).

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Appendix A

References

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