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MCHB-IP-RDE

15 MAY 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, Phoenix, Afghanistan, 16 November 2010-2 February 2011, U_AFG_PHOENIX_CM_A25_20110202

1. The enclosed report details the assessment of particulate matter (PM) air samples collected by 981st Medical Detachment personnel, Burn Pit, K-5 Transient Housing, Helipad, Barbeque (BBQ) Dining Facility (DFAC), Main DFAC, Crew Maintenance area, and A-Transportation Lot, Phoenix, Afghanistan, 16 November 2010-2 February 2011.

2. Based on the sample results and associated exposure information assessed in this report, the tactical risk estimate for $PM_{2.5}$ at the Burn Pit, K-5 Housing, Helipad, BBQ DFAC, Main DFAC, Crew Maintenance Site, and A-Transportation on both typical and peak exposure days during the sampled timeframe is **low**.

FOR THE DIRECTOR:

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Encl

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U.S. ARMY PUBLIC HEALTH COMMAND (Provisional)
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Deployment Occupational and Environmental Health Surveillance Sample Report,
U_AFG_PHOENIX_CM_A25_20110202
Health Risk Management Portfolio

Airborne Particulate Matter, Phoenix, Afghanistan

Prepared by (b) (6)
Deployment Environmental Surveillance Program

Preventive Medicine Surveys: 40-5f1

ACKNOWLEDGMENTS

DEPLOYMENT OCCUPATIONAL AND ENVIRONMENTAL HEALTH SURVEILLANCE SAMPLE REPORT AIRBORNE PARTICULATE MATTER PHOENIX, AFGHANISTAN 16 NOVEMBER 2010-2 FEBRUARY 2011 U_AFG_PHOENIX_CM_A25_20110202

1 References

See Appendix A for a list of references.

2 Purpose

This report provides the U.S. Army Public Health Command (Provisional) (USAPHC (Prov)), Army Institute of Public Health (AIPH) assessment of the laboratory analytical results and exposure information associated with the samples collected by 981st Medical Detachment on 16 November 2010-2 February 2011 at Burn Pit, K-5 Transient Housing, Helipad, Barbeque (BBQ) Dining Facility (DFAC), Main DFAC, Crew Maintenance area, and A-Transportation Lot, Phoenix, 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 (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 (Prov), AIPH, and weighed to determine particulate mass and calculate ambient concentrations. The USAPHC (Prov), 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 Appendix B.

5 Exposure Setting

Appendix C contains information about the sampling location, environmental conditions, and associated potential population exposure for each sample site. The information was provided on the field data sheets submitted with the sample set unless otherwise noted. Information about the individual samples including sample date and site, is provided in Appendix B. Correction and clarification of exposure assumptions by the sampling unit is encouraged.

6 Prescreen

Table 1 shows parameters identified as potential hazards because their peak single sample concentrations were 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. The pre-screening is conducted as described in USAPHC (Prov) TG 230, section 3.4.3. The sample results were compared to MEGs on 4 March 2011.

Table 1. Results of Prescreen

Parameter	Detections/ Samples	Peak Single Sample Concentration (µg/m^3)	1-year Negligible MEG (µg/m^3)	Result
$PM_{2.5}$ at Burn Pit	3/3	226	15	Retain as potential hazard
$PM_{2.5}$ at K-5	1/1	281	15	Retain as potential hazard
$PM_{2.5}$ at Helipad	4/4	200	15	Retain as potential hazard
$PM_{2.5}$ at BBQ DFAC	4/4	275	15	Retain as potential hazard
$PM_{2.5}$ at Main DFAC	2/2	203	15	Retain as potential hazard
$PM_{2.5}$ at Crew Maintenance	2/2	77	15	Retain as potential hazard
$PM_{2.5}$ at A-Trans Lot	2/2	175	15	Retain as potential hazard

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

7 Acute Risk Assessment

7.1 Acute Screen

Table 2 shows parameters identified as acute hazards because their peak sample day concentrations were greater than their acute screening MEGs. Acute hazards are further assessed to estimate the acute 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 2. Results of Acute Screen

Parameter	Peak Sample Day Concentration (µg/m^3)	Screening MEG (µg/m^3)	Result
$PM_{2.5}$ at Burn Pit	226	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at K-5	281	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at Helipad	200	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at BBQ DFAC	275	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at Main DFAC	203	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at Crew Maintenance	77	24-hour Negligible MEG: 65	Retain as acute hazard
$PM_{2.5}$ at A-Trans Lot	175	24-hour Negligible MEG: 65	Retain as acute hazard

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

7.2 Hazard Severity

Table 3 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 (Prov) TG 230, section 3.4.5.2.

Table 3. Hazard Severity

Parameter	Concentration (µg/m^3)	Comparison MEGs (µg/m^3)	Hazard Severity
$PM_{2.5}$ at Burn Pit	Peak: 226	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
	Average: 166	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
$PM_{2.5}$ at K-5	Peak: 281	Is ≥ 24-hour Marginal MEG: 250, but < 24-hour Critical MEG: 500	Marginal
	Average: 281	Is ≥ 24-hour Marginal MEG: 250, but < 24-hour Critical MEG: 500	Marginal
$PM_{2.5}$ at Helipad	Peak: 200	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
	Average: 160	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
$PM_{2.5}$ at BBQ DFAC	Peak: 275	Is ≥ 24-hour Marginal MEG: 250, but < 24-hour Critical MEG: 500	Marginal

Parameter	Concentration ($\mu g/m^3$)	Comparison MEGs ($\mu g/m^3$)	Hazard Severity
	Average: 180	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
$PM_{2.5}$ at Main DFAC	Peak: 203	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
	Average: 186	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
$PM_{2.5}$ at Crew Maintenance	Peak: 77	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
	Average: 73	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
$PM_{2.5}$ at A-Trans Lot	Peak: 175	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible
	Average: 153	Is > 24-hour Negligible MEG: 65, but < 24-hour Marginal MEG: 250	Negligible

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

7.3 Hazard Probability

Table 4 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 4. Hazard Probability

Parameter	Concentration ($\mu g/m^3$)	Hazard Probability
$PM_{2.5}$ at Burn Pit	Peak: 226	Occasional
	Average: 166	Seldom
$PM_{2.5}$ at K-5	Peak: 281	Unlikely
	Average: 281	Unlikely
$PM_{2.5}$ at Helipad	Peak: 200	Seldom
	Average: 160	Seldom
$PM_{2.5}$ at BBQ DFAC	Peak: 275	Unlikely
	Average: 180	Seldom
$PM_{2.5}$ at Main DFAC	Peak: 203	Seldom
	Average: 186	Seldom
$PM_{2.5}$ at Crew Maintenance	Peak: 77	Unlikely
	Average: 73	Unlikely
$PM_{2.5}$ at A-Trans Lot	Peak: 175	Seldom
	Average: 153	Seldom

7.4 Tactical Risk Estimate

Table 5 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 Field Manual 1-02 "Operational Terms and Graphics."

Table 5. Risk Assessment Summary

Parameter	Type of Exposure	Hazard Severity	Hazard Probability	Tactical Risk Estimate
$PM_{2.5}$ at Burn Pit	Peak	Negligible	Occasional	Low
	Average	Negligible	Seldom	Low
$PM_{2.5}$ at K-5	Peak	Marginal	Unlikely	Low
	Average	Marginal	Unlikely	Low
$PM_{2.5}$ at Helipad	Peak	Negligible	Seldom	Low
	Average	Negligible	Seldom	Low
$PM_{2.5}$ at BBQ DFAC	Peak	Marginal	Unlikely	Low
	Average	Negligible	Seldom	Low
$PM_{2.5}$ at Main DFAC	Peak	Negligible	Seldom	Low
	Average	Negligible	Seldom	Low
$PM_{2.5}$ at Crew Maintenance	Peak	Negligible	Unlikely	Low
	Average	Negligible	Unlikely	Low
$PM_{2.5}$ at A-Trans Lot	Peak	Negligible	Seldom	Low
	Average	Negligible	Seldom	Low

8 Conclusion

Refer to USAPHC (Prov) TG 230, Table 3-2 for the potential consequences to military operations and force readiness associated with this risk level.

Based on the sample results and associated exposure information assessed in this report, the tactical risk estimate for $PM_{2.5}$ at the Burn Pit, K-5 Housing, Helipad, BBQ DFAC, Main DFAC, Crew Maintenance area, and A-Transportation Lot on both typical exposure and peak exposure days during the sampled timeframe is **low**.

9 Limitations

9.1 Field Data Quality

The field data sheets provided with the sample set were not adequately filled out. The post sample time was recorded incorrectly. The post sample time is the time the sample equipment stops actively sampling the air; not the time the sample collector returns to pick up the equipment/media.

Some of the samples were invalid due to improper sample collection and equipment failure.

9.2 Sample Receipt at USAPHC (Prov) Laboratory

The sample set was packaged correctly.

9.3 Laboratory Data Quality

Some parameters in this data set are flagged with a J code (^{J}). This code indicates an estimated value that was detected above the Method Detection Limit but below the Method Reporting Limit (also known as Limit of Quantitation or Practical Quantitation Limit).

9.4 Risk Assessment

Parameter concentrations on days with multiple samples were averaged together to determine a single concentration for the day.

If a parameter was not detected in all samples, half of the laboratory reporting limit was used to calculate an average.

10 Recommendations and Notes

Maintain communication with USAPHC (Prov), 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 Phoenix, 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 (Prov), AIPH POCs for this assessment are Mrs. (b) (6) and Mr. (b) (6). Mrs. (b) (6) may be contacted at e-mail (b) (6) and Mr. (b) may be contacted at e-mail (b) (6), or DSN (b) (6) or commercial (b) (6).

(b) (6)

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Environmental Scientist
Deployment Environmental Surveillance Program

Approved by:

(b) (6)

Acting 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 (DA) Field Manual (FM) 5-19, Composite Risk Management, 21 August 2006.

4. DA FM 1-02, Operational Terms and Graphics, 21 September 2004.

5. USAPHC (Prov) Technical Guide (TG) 230, Chemical Exposure Guidelines for Deployed Military Personnel, June 2010.

Appendix B

Sample Identification Information

DOEHRS-EH Sample ID	Sample ID Reported on Field Data Sheet	Sample Site	Date and Time Sample Collected	Sample Invalid (Yes/No) Reason for Invalid Sample
00003NJC	AFG_PHOENI_10321_PM2.5DPS	K5 (Transient Housing)	2010/11/16 1305	No
00003NJS	AFG_PHOENI_10321_PM2.5DPS	Burn Pit	2010/11/16 1300	No
00003NJD	AFG_PHOENI_10321_PM2.5DPS	Main DFAC	2010/11/16 1308	Yes, Missing Field Data
00003NJA	AFG_PHOENI_10321_PM2.5DPS	Helipad	2010/11/16 1314	No
00003NJL	AFG_PHOENI_10321_PM2.5DPS	BBQ DFAC	2010/11/16 1314	No
00003NIX	AFG_PHOENI_10327_PM2.5DPS	Burn Pit	2010/11/22 1335	Yes, Flow Differential
00003NJ1	AFG_PHOENI_10327_PM2.5DPS	BBQ DFAC	2010/11/22 1343	No
00003NJ6	AFG_PHOENI_10327_PM2.5DPS	Helipad	2010/11/22 1343	No
00003ZL1	AFG_PHOENI_11025_PM25DPS	K5	2011/01/25 1015	Yes, Flow Differential
00003ZKW	AFG_PHOENI_11025_PM25DPS	Main DFAC	2011/01/25 1024	No
00003ZKG	AFG_PHOENI_11025_PM2.5DPS	Burn Pit	2011/01/25 1025	No
00003ZMF	AFG_PHOENI_11025_PM25DPS	BBQ DFAC	2011/01/25 1033	No
00003ZMA	AFG_PHOENI_11025_PM25DPS	Helipad	2011/01/25 1050	No
00003ZKJ	AFGPHOENI11026	Crew Maintenance	2011/01/26 1530	No
00003ZMJ	AFGPHOENIX11026	A-Trans Lot	2011/01/26 1530	No
000040Z4	AFG_PHOENI_11031_PM2.5DPS	BBQ DFAC	2011/01/31 1005	No

DOEH Surveillance Sample Report, Airborne PM, Phoenix, Afghanistan, 16 Nov 10-2 Feb 11, U_AFG_PHOENIX_CM_A25_20110202

DOEHRS-EH Sample ID	Sample ID Reported on Field Data Sheet	Sample Site	Date and Time Sample Collected	Sample Invalid (Yes/No) Reason for Invalid Sample
000040YR	AFG_PHOENI_11031_PM2.5DPS	Helipad	2011/01/31 1015	No
000040YW	AFG_PHOENI_11031_PM2.5DPS	Burn Pit	2011/01/31 1020	No
000040YQ	AFG_PHOENI_11031_PM2.5DPS	Main DFAC	2011/01/31 1025	No
000040YH	AFGPHOENI11033	Crew Maintenance	2011/02/02 1045	No
000040YK	AFGPHOENI11033	A Trans	2011/02/02 1045	No

Appendix C

Exposure Setting Information

Table C-1. Exposure Information at the Burn Pit

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at Burn Pit.
What is the timeframe under consideration?	The samples were collected on 16 November 2010-31 January 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	Burn pit.
What is known about the exposure setting?	The Burn Pit is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	Specific information about the sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-2. Exposure Information at the K-5 Housing

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the K-5 Housing site.
What is the timeframe under consideration?	The samples were collected on 16 November 2010. This encompasses a timeframe of approximately 1 day of sampling. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 1 day is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	None provided.
What is known about the exposure setting?	The K-5 Housing is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-3. Exposure Information at the Helipad

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the Helipad.
What is the timeframe under consideration?	The samples were collected on 16 November 2010-31 January 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	None provided.
What is known about the exposure setting?	The Helipad is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-4. Exposure Information at the BBQ DFAC

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the BBQ DFAC.
What is the timeframe under consideration?	The samples were collected on 16 November 2010-31 January 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	Located 100 yards from the transportation bay.
What is known about the exposure setting?	The Fuel Point is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was at the BBQ DFAC next to the smoker's patio and along the main road.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-5. Exposure Information at the Main DFAC

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the Main DFAC.
What is the timeframe under consideration?	The samples were collected on 25 November 2010-31 January 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	None provided.
What is known about the exposure setting?	The Main DFAC is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-6. Exposure Information at the Crew Maintenance Site

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the Maintenance Crew site.
What is the timeframe under consideration?	The samples were collected on 26 November 2010-2 February 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	None provided.
What is known about the exposure setting?	The Maintenance Crew is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Table C-7. Exposure Information at the A-Transportation Site

Questions About Exposure	Information Provided and Assumptions
What is the exposure event or ambient environmental condition under consideration?	Exposure to PM less than 2.5 micrometers in diameter ($PM_{2.5}$) and metals in the ambient air at this location.
What is the population at risk?	The population at the A-Transportation site.
What is the timeframe under consideration?	The samples were collected on 26 November 2010-2 February 2011. This encompasses a timeframe of approximately 3 months from the first day of sampling to the last. Although personnel will be deployed to this location for approximately 1 year, only this timeframe of 3 months is being considered.
What are the activity patterns of the exposed population?	Typical exertion across the base camp.
What is known about sources of potential contamination?	None provided.
What is known about the exposure setting?	The A-Transportation site is a sample site at Bagram, Afghanistan.
What are the exposure pathways?	Inhalation.
Where are the sampling sites relative to where exposure occurs?	The sampler location was not provided.

Note: Questions are extracted from USAPHC (Prov) TG 230

Appendix D

Hazard Probability Scoring Tables

Table D-1. Hazard Probability Scoring for $PM_{2.5}$ at Burn Pit

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: 226	Score 3: Concentration is >75th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 8: Occasional
Average: 166	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom

Table D-2. Hazard Probability Scoring for $PM_{2.5}$ at K-5 Housing

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: 281	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely
Average: 281	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely

Table D-3. Hazard Probability Scoring for $PM_{2.5}$ at the Helipad

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: 200	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom
Average: 160	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom

Table D-4. Hazard Probability Scoring for $PM_{2.5}$ at the BBQ DFAC

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: 275	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely
Average: 180	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom

Table D-5. Hazard Probability Scoring for $PM_{2.5}$ at the Main DFAC

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: 203	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom
Average: 186	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom

Table D-6. Hazard Probability Scoring for $PM_{2.5}$ at the Crew Maintenance

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: 77	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely
Average: 73	Score 1: Concentration is <25th percentile of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 6: Unlikely

Table D-7. Hazard Probability Scoring for $PM_{2.5}$ at the A-Transportation Lot

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: 175	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom
Average: 153	Score 2: Concentration is at or between 25th and 75th percentiles of severity range.	Score 2: Field data adequately estimates population exposure (Routine Sampling).	Score 1: Field exposure duration to MEG exposure duration is <1 (Personnel will not spend the entire 24-hours at the sampling location).	Score 2: Typical exertion (no information to indicate otherwise).	Total Score 7: Seldom