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DOCUMENT TITLE: Deployment Environmental Surveillance, Air Quality Assessment, Bagram, Afghanistan

DATE: 19-23 April 2005

PROGRAM: 47

DEPARTMENT OF THE ARMY
US ARMY CENTER FOR HEALTH PROMOTION AND PREVENTIVE MEDICINE-EUROPE
CMR 402
APO AE 09180

REPLY TO
ATTENTION OF

MCHB-AE-EE

DEC 0 2 2005

MEMORANDUM FOR Task Force Strength, 71st Medical Detachment (Commander/ MAJ Gellasch), APO AE 09534

SUBJECT: Deployment Environmental Surveillance, Air Quality Assessment, Project Number 47-4A-1116-05, Bagram, Afghanistan, 19-23 April 2005

A copy of the report is enclosed. We are very interested in your comments and suggestions for improving the usefulness of the information and recommendations provided in the report. If you have comments, or if this report does not meet your needs or expectations, please contact the undersigned at DSN (b) (6) or commercial (b) (6).

FOR THE COMMANDER:

(b) (6)

2 Encls
1. Executive Summary
2. Report

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DEPLOYMENT ENVIRONMENTAL SURVEILLANCE
AIR QUALITY ASSESSMENT
47-4A-1116-05
BAGRAM, AFGHANISTAN
19-23 APRIL 2005

1. **REFERENCES**. A complete listing of references is provided in Appendix A.

2. **PURPOSE**. In accordance with U.S. Department of Defense medical surveillance requirements, this OEH risk characterization documents the identification and evaluation of chemical hazards that pose potential health and operational risks to deployed troops. Specifically, the subject 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 the above-mentioned location. The primary reference for this report is the 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 (reference 1).

3. **SCOPE**. This evaluation addresses the analytical results for 6 ambient air samples collected from Bagram Airfield from 19 – 23 April 2005. These samples are limited in time, area, and media and therefore 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) 100-14} (reference 2) and the relatively conservative (protective) assumptions and methods provided in USACHPPM TG 230 to facilitate decision-making that can minimize the likelihood of significant risks. Appendix B provides a summary of the samples evaluated in this report.

4. **BACKGROUND AND EXPOSURE ASSUMPTIONS**. The subject samples were obtained to assess the potential for adverse health effects to troops routinely and continuously breathing the ambient air at Bagram Airfield. The field data sheets did not specify locations, only sub-camps: Camp Coyote and Infantry Village. All personnel are exposed to the sampled air and are expected to remain at this location for over one year. A conservative (protective) assumption is that inhalation of the air occurs 24 hrs/day for 365 days (1 year). In addition, it is assumed that control measures and/or personal protective equipment (PPE) are not used.

5. **METHOD**. The U.S. Army Center for Health Promotion and Preventive Medicine-Europe (USACHPPMEUR) Deployment Environmental Surveillance Program uses USACHPPMTG 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.

a. General. 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 one year of continuous daily exposures, based on currently available data.

b. Assessment. Information about potential health effects are obtained from data provided with the exposure values used to derive the MEGs and symptoms reported from occupational exposures. The quality and quantity of dose and response information available varies with the hazard and the determination of a precise "no effect" levels for low level exposures for extended duration involves professional judgment. Hazards with exposure concentrations greater than comparison levels are identified as potential health threats, carried through the hazard assessment process, and assigned a risk estimate consistent with operational risk management 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 Analysis. The samples were analyzed for chromium and were compared to the respective MEG presented in USACHPPM TG 230. Appendix B contains a Sample Summary Table. Laboratory accreditation is provided in Appendix C. Appendix D presents detailed laboratory results.

b. Sampling Errors. Sample number AFG_BAF_02A_5112 was submitted with no sample volume information, therefore, was recorded as an invalid sample.

c. Sample Results. All detected parameters were at concentrations less than their respective 1-yr, MEGs.

7. **HAZARD ASSESSMENT.**

a. Hazard Severity. The hazard severity for the potential health threats of concern was determined by comparison of detected concentrations to MEGs published in USACHPPM TG 230. The hazard severity for chromium is considered **NEGLIGIBLE** because the concentrations were below the MEG.

b. Hazard Probability. The hazard probability was based on an approximation of the percentage of personnel that would be exposed to an identified hazard above a MEG (in terms of concentration and as well as exposure assumptions) and using USACHPPM TG 230 Table 3-2: "Chemical Hazard Probability Ranking Chart for Military Deployments." It is assumed that all or most personnel at this location are equally exposed to the ambient air. The probability that personnel will be exposed to chromium above the MEG is considered **UNLIKELY**.

c. Risk Estimate and Confidence. The hazard severity and probability levels described above were used with the ORM matrix in USACHPPM TG 230 Table 3-3/FM 100-14 to provide

a risk estimate for exposure to each identified hazard. The risk estimate for exposure to chromium in the ambient air at Camp Coyote and Infantry Village, Bagram Airfield is **LOW**. Per USACHPPM TG 230 Table 3-5: "Example Criteria for Assigning Confidence Levels," confidence in the risk estimate at this location 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. **CONCLUSION**. No potential health threats were identified. The OEH risk estimate for exposure to chromium in the ambient air at Bagram Airfield (Camp Coyote and Infantry Village) is **LOW**. Confidence in the risk estimate is considered **LOW**.

9. **RECOMMENDATIONS**.

a. Continue to collect air samples over time to increase confidence in risk estimates.

b. Follow the sampling guidance specified in USACHPPM TG 251 for the proper collection and recording of field data. Following proper procedures will increase the overall confidence in the data.

10. **TECHNICAL ASSISTANCE.** Questions concerning this report should be directed to (b) (6), fax DSN (b) (6), civilian (b) (6), or email: (b) (6). Requests for additional services should be directed to the Environmental Engineering Division, USACHPPMEUR, MAJ (b) (6) at DSN (b) (6) or email: (b) (6).

(b) (6)
Environmental Engineer

APPROVED:

(b) (6)
MAJ, MS
Chief, Environmental Engineering Division

APPENDIX A

REFERENCES

1. U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), Technical Guide (TG) 230, *Chemical Exposure Guidelines for Deployed Military Personnel Updated May 2003 with January 2004 Addendum*, January 2004.

2. Department of the Army, Field Manual 100-14, *Risk Management*, 23 April 1998.

3. USACHPPM, Draft Technical Guide 251, *A Soldiers Guide to Environmental and Occupational Field Sampling for Military Deployment*, August 2001.

APPENDIX B

SAMPLE SUMMARY

Table B-1 Sample Summary Results Bagram Airfield

Field ID Number	Sample Location	Collection Date	Sample Duration	Sample Volume	Invalid Sample? Yes/No/Blank	Sampler ID Number	Field Notes
AFG_BAF_01A_5109	Camp Coyote	19-Apr-05	457	959.7	No	672227	
AFG_BAF_02A_5109	Camp Coyote	19-Apr-05	455	914.5	No	672255	
AFG_BAF_03A_5109	Infantry Village	19-Apr-05	351	687	No	672220	
AFG_BAF_04A_5109	No Data	19-Apr-05	No Data	No Data	Blank	No Data	
AFG_BAF_01BL_5109	No Data	19-Apr-05	No Data	No Data	Blank	No Data	
AFG_BAF_01A_5110	Camp Coyote	20-Apr-05	424	712.3	No	672220	
AFG_BAF_02A_5110	Camp Coyote	20-Apr-05	424	856.5	No	672255	
AFG_BAF_03A_5110	Infantry Village	20-Apr-05	425	862.8	No	672227	
AFG_BAF_01A_5112	No Data	22-Apr-05	465	943	No	672227	A burn barrel was smoking about 10 ft. away from sample.
AFG_BAF_02A_5112	No Data	22-Apr-05	464	No Data	Yes	672220	
AFG_BAF_03A_5112	No Data	22-Apr-05	464	774	No	672207	A burn barrel was smoking about 50 ft. away from sample.
AFG_BAF_01A_5113	Camp Coyote	23-Apr-05	469	919.2	No	672227	A burn barrel was smoking about 5 ft. away from sample.
AFG_BAF_02A_5113	Camp Coyote	23-Apr-05	469	918.7	No	672255	
AFG_BAF_03A_5113	Infantry Village	23-Apr-05	471	946.4	No	672207	
AFG_BAF_01BL_5113	No Data	23-Apr-05	No Data	No Data	Blank	No Data	
AFG_BAF_02BL_5113	No Data	23-Apr-05	No Data	No Data	Blank	No Data	

APPENDIX C

LABORATORY METHODOLOGY AND ACCREDITATION

1. **LABORATORY METHODOLOGY.** Samples analyzed for total metals were tested quantitatively by the USACHPPMEUR DLS using EPA Method 200.7. Samples analyzed for petroleum aliphatic hydrocarbons (PAH), hydrocarbon index, pesticides and herbicides were tested quantitatively by a USACHPPMEUR DLS contract laboratory using DIN Methods. For additional details, please consult the USACHPPMEUR DLS Customer Guide, available on-line at www.chppmeur.healthcare.hqusareur.army.mil.

2. **LABORATORY ACCREDITATION.**

a. DLS. The Deutscher Akkreditierungs Rat (DAR) (German Accreditation Council) recognizes the DIN EN ISO/IEC 17025 accreditation by the Deutsches Akkreditierungssystem Prüfwesen GmbH (DAP) of the USACHPPMEUR DLS. The DAP is signatory to the Multilateral Agreement of the European cooperation for Accreditation and to the Mutual Recognition Agreement of the International Laboratory Accreditation Cooperation. The signatories to these agreements mutually recognize their accreditations of testing laboratories. The countries of Belgium, Germany, Italy, The Netherlands, Spain, United Kingdom, and the U.S. are among the signatories. The American Industrial Hygiene Association (AIHA) has also accredited the DLS Environmental Lead Testing Program, according to the requirements of ISO/IEC 17025, which is recognized under the EPA Office of Pollution Prevention and Toxics' National Lead Laboratory Accreditation Program for the matrices of dust, soil, paint chips (residual), and air. USACHPPMEUR DLS is registered to ISO 9001:2000 for its Quality Management System and to ISO 14001 for its Environmental Management System.

b. Contract Laboratories. As dictated by the mission or workload, USACHPPMEUR DLS may utilize the services of local laboratories with similar accreditation which are under contract to USACHPPMEUR. Additional accreditation information is available upon request.

APPENDIX D

USACHPPMEUR LABORATORY ANALYSIS

Footnotes for the following tables:

[1] TG 230 – USACHPPM Technical Guide 230 – Short Term Chemical Exposure Guidance
[2] MEG – Military Exposure Guideline (1-year deployment)
** - Parameter is not covered by this reference
NAF – This sample was not analyzed for this parameter

Table D-1: Air Sample (Chromium)

FIELD ID	STANDARD		01A-05109	02A-05109	03A-05109	01BL-05109	04A-05109
PROJECT NUMBER			47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05
LOCATION			Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan
COLLECTION DATE			19 April 2005	19 April 2005	19 April 2005	19 April 2005	19 April 2005
PARAMETERS	UNITS	TG 230[1] MEG[2] (1-Year)	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Metals							
Chromium	µg		<1	<1	<1	<1	<1
	mg/m^3	0.012	<0.0010	<0.0011	<0.0015	***	***
						Blank	Blank

Table D-2: Air Sample (Chromium)

FIELD ID	STANDARD		01A-05110	02A-05110	03A-05110	01A-05112	02A-05112	03A-05112
PROJECT NUMBER			47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05
LOCATION			Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan	Bagram Afghanistan
COLLECTION DATE			20 April 2005	20 April 2005	20 April 2005	22 April 2005	22 April 2005	22 April 2005
PARAMETERS	UNITS	TG 230[1] MEG[2] (1-Year)	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Metals								
Chromium	µg		<1	<1	<1	<1	Invalid	<1
	mg/m^3	0.012	<0.0014	<0.0012	<0.0012	<0.0011	Sample	<0.0013

*** *No Volume provided on Field Data Sheet; results cannot be reported.*

Table D-3: Air Sample (Chromium)

FIELD ID	STANDARD		01A-05113	02A-05113	03A-05113	01BL-05113	02BL-05113
PROJECT NUMBER			47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05	47-4A-1116-05
LOCATION			Bagram	Bagram	Bagram	Bagram	Bagram
			Afghanistan	Afghanistan	Afghanistan	Afghanistan	Afghanistan
COLLECTION DATE			23 April 2005	23 April 2005	23 April 2005	23 April 2005	23 April 2005
PARAMETERS	UNITS	TG 230[1] MEG[2] (1-Year)	RESULTS	RESULTS	RESULTS	RESULTS	RESULTS
Metals							
Chromium	µg		<1	<1	<1	<1	<1
	mg/m^3	0.012	<0.0011	<0.0011	<0.0011	***	***
						Blank	Blank

*** *No Volume provided on Field Data Sheet; results cannot be reported.*