

MCHB-TS-RDE (40)

8 November 2001

MEMORANDUM FOR Commander, 5th Special Forces Group, Joint Special Operations Task Force – North, ATTN: CPT [REDACTED], Camp Freedom, Karshi Khanabad Airfield, Uzbekistan

SUBJECT: (U) ~~(S)~~ Preliminary Occupational and Environmental Health Surveillance Assessment No. 47-MA-7688, Operation Enduring Freedom, Camp Freedom, Karshi Khanabad Airfield, Uzbekistan

1. (U) ~~(S)~~ REFERENCES.

- a. (U) USACHPPM Technical Guide 230, Chemical Exposure Guidelines for Deployed Military Personnel, DRAFT October 2001.
- b. [REDACTED]
- c. (U) Field Manual (FM) 100-14, Risk Management, Department of the Army, 23 April 1998.

2. (U) ~~(S)~~ The USACHPPM, Deployment Environmental Surveillance Program, is providing the first operational risk management estimate for deployment and water samples collected at Camp Freedom, Uzbekistan, in support of Operation Enduring Freedom. These samples were collected on 22 October 2001, by the 5th Special Forces Group, Joint Special Operations Task Force – North, and sent through the USACHPPM-Europe Directorate of Laboratory Services (DLS) to the USACHPPM-Main DLS for analyses. For the deployment water sample (sample identification FRE_01W_01295; treated water near ROWPU bladder), analyses were conducted for contaminant classes to include heavy metals; volatile and semi-volatile organics; polycyclic aromatic hydrocarbons, PCBs, radiation screen. For the deployment soil samples (sample identifications FRE_01S_01295; FRE_02S_01295; FRE_03S_01295) analyses were conducted for pesticides; herbicides; SVOCs; metals; and radiation screens. The USACHPPM-Europe has deployed a special medical augmentation response team – preventive medicine (SMART-PM) to Camp Freedom, Karshi Khanabad Airfield, to conduct a comprehensive occupational and environmental health surveillance assessment.

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3. (U) (~~S~~)- KARSHI KHANABAD AIRFIELD. The Karshi Khanabad Airfield is located approximately 100 nautical miles north of the Afghanistan/Uzbekistan border. The current base camp, Camp Freedom, is located at the northwest end of the main runway adjacent to the aircraft repair facility. [REDACTED] To date, over 200 occupational and environmental health surveillance samples have been collected at Camp Freedom in order to characterize any health/medical threats due to the known contamination sources.

4. (U) (~~S~~)- SAMPLING RESULTS. For the water sample, a total of 10 metals displayed concentrations above respective analytical detection limits. A total of 9 volatile, semi-volatile organics displayed concentrations above respective analytical detection limits. For the general water quality indicators, all were within acceptable ranges as listed in TB MED 577. There were no detections of radiologicals. The Appendix contains a summary of the deployment water sample results. For the three soil samples, a total of four metals displayed concentrations above respective analytical detection limits. The Appendix contains a summary of the deployment soil sample results.

5. (U) (~~S~~)-HEALTH RISK ASSESSMENT

a. (U) Procedures. The sampling data discussed in the previous sections were used to characterize the potential operational risks for field units deployed to the Camp Freedom site. Exposure to compounds in both soil and drinking water were characterized. The risk assessment was performed according to doctrine described in FM 100-14 and standard practices for deployment health risk assessment (Reference 1c). For the hazard identification, an occupational and environmental health (OEH) chemical hazard is any chemical or chemical mixture that can cause injury, illness, disease, adverse health conditions, or death for personnel (a health threat). Such conditions may also affect the health status of the field unit or command, in terms of mission effectiveness (a medical threat).

b. (U) (~~S~~)-Exposure Profile. An exposure profile is a description of predicted patterns of exposure field personnel will experience while deployed. Exposure patterns describe the frequency and duration of potential personnel exposures to OEH hazards. These patterns also contribute to determining the nature and magnitude of health effects that may be experienced upon exposure to unsafe levels of chemicals. The primary purpose of the exposure profile is to identify one or more exposure periods and exposure media for personnel in the field unit.

(1) (U) (~~S~~)-Activity Patterns. Potential Camp Freedom personnel may eventually consist of units that live in and patrol the area for up to 24 hours a day. The specific deployment length is not known at this time so a 1-year exposure will be assumed for this evaluation.

(2) (U) (~~S~~)-Exposure Patterns. Based on the limited sampling data available, it is impossible to provide a complete assessment of potential exposure over time. However, it is assumed for this assessment that the water sample collected represents the overall quality of the water source in question which represents the sole source of potable water for Camp Freedom.

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(3) (U) (S)-Exposure Periods. This report assesses the potential for health threats based on daily exposures to lead in water at levels detected during the October sampling event. It was assumed that soldiers would be present at Camp Freedom 24 hours per day for the duration of their deployment. This should be a conservative assumption that will add a margin of safety to the evaluation.

c. (U) (S)-Preliminary Threat Analysis. The potential soil and water chemical hazards can be classified into health threat categories based on a comparison of conservative estimates of the exposure point concentrations to available standard military guidelines. The tables below present the maximum detected concentrations along with the exposure guideline as a point of comparison. As a preliminary evaluation, all compounds detected were compared to soil and water MEGs as listed in TG-230B (reference 1a). If a MEG was not available, the USEPA Region 9 Preliminary Remediation Goal was used as a guideline with the exception of lead. For lead, the USEPA Maximum Contaminant Level (MCL) was used. The MEGs are meant to be protective for continuous exposures up to one year in duration. The EPA Region 9 PRGs and EPA MCLs are protective for a lifetime of exposure and are therefore much more conservative than the MEGs.

(U) Table 1. Soil Data

Compound	Concentration (mg/kg)	Guideline (mg/kg)	Source
Barium	96.8	5400	EPA Region 9
Chromium	26.3	5700	TG230
Nickel	27.8	1600	EPA Region 9
Strontium	184	140,000	TG230

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(U) Table 2. Treated Water Data

Compound	Concentration (mg/L)	Guideline (mg/L)		Source
		5 L/day	15 L/day	
Copper	0.2	0.5	0.2	TG230
Lead	0.0233	0.015	0.015	USEPA MCL
Nickel	0.0105	Na	Na	Na
Toluene	0.00911	3	1	TG230
Chloride	5.1	600	200	TG230
Chloroform	0.00398	1.4	0.5	TG230
Di-n-butylphthalate	0.0039	Na	Na	Na
Chromium	0.00344	0.3	0.1	TG230
Calcium	2.46	Na	Na	Na
Chloromethane	0.0018	0.5	0.17	TG230
Sodium	1.73	Na	Na	Na
Magnesium	1.56	100	30	TG230
Bromodichloromethane	0.00155	0.3	0.1	TG230
Barium	0.00152	2.6*	--	Region 9 PRG
Zinc	0.858	4	1.3	TG230
Methyl Chloroform	0.0007	Na	Na	Na
1,2,4-Trimethylbenzene	0.00067	0.7	0.23	TG230
Napthalene	0.00067	0.5	0.17	TG230
Bis(2-ethylhexyl)phthalate	0.000467	0.28	0.056	TG230
Iron	0.063	11*	--	Region 9 PRG

* Guideline represents value for residential application based on 2 L/day of consumption.

In addition to the chemical analyses, general water quality indicators were measured as well, including pH, turbidity, and Total Dissolved Solids. Each of these was within the acceptable range as listed in TB MED 577. Radiologicals were also tested for but not detected.

(1) (U) ~~(S)~~ Of the compounds analyzed for in both soil and water, only lead in the potable water exceeded the relevant guideline. Continued exposure to elevated levels of lead in water can cause central nervous system effects ranging from anxiety and irritability, to convulsions, coma and death. Therefore, lead is classified as a potential medical threat and will be evaluated further.

(2) (U) ~~(S)~~ The detected copper concentration met the guideline for 15 L/day of consumption but did not exceed it. However, with only a single sample collected, it is impossible to determine whether or not copper levels may fluctuate above the guideline over time. Further sampling may be necessary to more clearly establish the copper levels in the water.

d. (U) ~~(S)~~ Hazard Probability. For the purpose of this assessment, it was assumed that the water sample represents the sole source of drinking water for Camp Freedom. Therefore, greater than 90% of the soldiers stationed at the camp would be consuming up to 15 L per day for the duration of their deployment. Based on these assumptions, the hazard probability is considered FREQUENT.

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e. (U) (~~(S)~~)-Hazard Severity. Using the Chemical Hazard Severity Ranking Chart for Military Deployments provided in TG 230, the hazard severity associated with the detected lead in potable water is classified as MARGINAL. This indicates that up to 10% of personnel may be expected to develop illness that begins to impair functional abilities during the mission.

f. (U) (~~(S)~~)-Risk Characterization. In order to evaluate the overall operational risk, the hazard probability and severity are compared to the Risk Assessment Matrix provided in TG 248. Combining the hazard probability of FREQUENT with the hazard severity of MARGINAL produces a risk estimate of HIGH. However, this estimate likely overstates the potential risk. Since the guideline for lead is based on a USEPA value for the general population, it is meant to be protective of a lifetime of exposure including children, the elderly, and other sensitive individuals. Taking this information into account, the final operational risk estimate is reduced to MODERATE. This corresponds to a unit status of AMBER (Mission Capable, with minor deficiencies). The confidence in this risk estimate is LOW due to the lack of information regarding actual exposure patterns at the camp as well as the extremely limited sampling data available.

g. (U) (~~(S)~~)-Develop Controls. The sample of treated water that was collected at Camp Freedom seems to indicate that the Reverse Osmosis unit is not functioning properly. If the source of the malfunction is identified and corrected, and additional sampling is conducted, the water source could be utilized for consumption in the future. If this is not possible, an alternative source of potable water should be identified. If these actions are taken, the resulting risk would be reduced to No Risk.

h. (U) (~~(S)~~)-Uncertainties. Overall, this OEH evaluation is meant to be conservative and should be adequately protective of soldiers' health under the conditions evaluated. However, a degree of uncertainty is inherently associated with this type of assessment. The true exposure frequencies of Camp Freedom personnel were not known so it was assumed that soldiers would be exposed to the detected hazards continuously for an entire year. However, only a single water sample was collected so it is impossible to account for natural variation in the levels throughout the course of a year.

i. (U) (~~(S)~~)-HRA Conclusion. Concentrations of lead in treated water, as measured during this sampling event, would pose a potential medical threat to personnel stationed at Camp Freedom. However, the limited data available for this evaluation do not allow for a confident assessment of deployment-length exposures. Future iterations of this evaluation will allow for a more accurate evaluation of potential hazard.

6. (U) (~~(S)~~)-CONCLUSIONS.

a. (U) (~~(S)~~)-For the Camp Freedom water sample, a total of 10 metals displayed concentrations above respective analytical detection limits. A total of 9 volatile, semi-volatile organics displayed concentrations above respective analytical detection limits, these did not exceed applicable health based guidelines. For the general water quality indicators, all were within

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acceptable ranges as listed in TB MED 577. There were no detections of radiologicals.

- b. (U) ~~(S)~~ For the three Camp Freedom soil samples, a total of four metals displayed concentrations above respective analytical detection limits, and these did not exceed applicable health based guidelines.
- c. (U) ~~(S)~~ Concentrations of lead in treated water, as measured during this sampling event, would pose a potential medical threat to personnel stationed at Camp Freedom. However, the limited data available for this evaluation do not allow for a confident assessment of deployment-length exposures
- d. (U) ~~(S)~~ On-going occupational and environmental health surveillance efforts to further characterize the environment will allow us to assess the overall OEHS risks at Camp Freedom in the near future.

7. (U) ~~(S)~~ RECOMMENDATIONS.

- a. (U) Collect additional deployment water samples (minimum of three over a five day period) from this treated water source to have them analyzed to confirm the concentration results in this assessment. This will allow for a more robust hazard severity estimate to be made, which will potentially update the overall operational risk management level estimate.
- b. (U) ~~(S)~~ Continue to collect occupational and environmental health surveillance samples for the air, water, and soil media using current equipment and media inventories for the stated contamination sources located in/around Camp Freedom. Establish air sampling measures for volatile organics using EPA Method TO17. The USACHPPM-Main will identify and provide these additional equipment/media sets thru the USACHPPM-Europe to complete this requirement.
- c. (U) ~~(S)~~ The USACHPPM-Main will continue to assimilate the electronic deliverable data from both the USACHPPM-Europe and USACHPPM-Main laboratories into one single electronic data deliverable product for Camp Freedom. This single deliverable product will be the main dataset on which more comprehensive operational risk management levels can be estimated on the over 200 occupational and environmental health samples collected at Camp Freedom.

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8. (U) The points of contact for this preliminary assessment are [REDACTED] and [REDACTED]. The STU-III extension is [REDACTED]

FOR THE COMMANDER:

//signed//

Encl

[REDACTED], Ph.D.
Acting Program Manager
Deployment Environmental Surveillance

CF (w/encl):

HQDA (DASG-HCO)

CDR, 3rd U.S. Army/ARCENT, ATTN: AFRD-SG (COL [REDACTED])

CDR, USACHPPM-EUROPE, ATTN: MCHB-AE-EE

CDR, USCENTCOM, ATTN: CCSG (MAJ [REDACTED])

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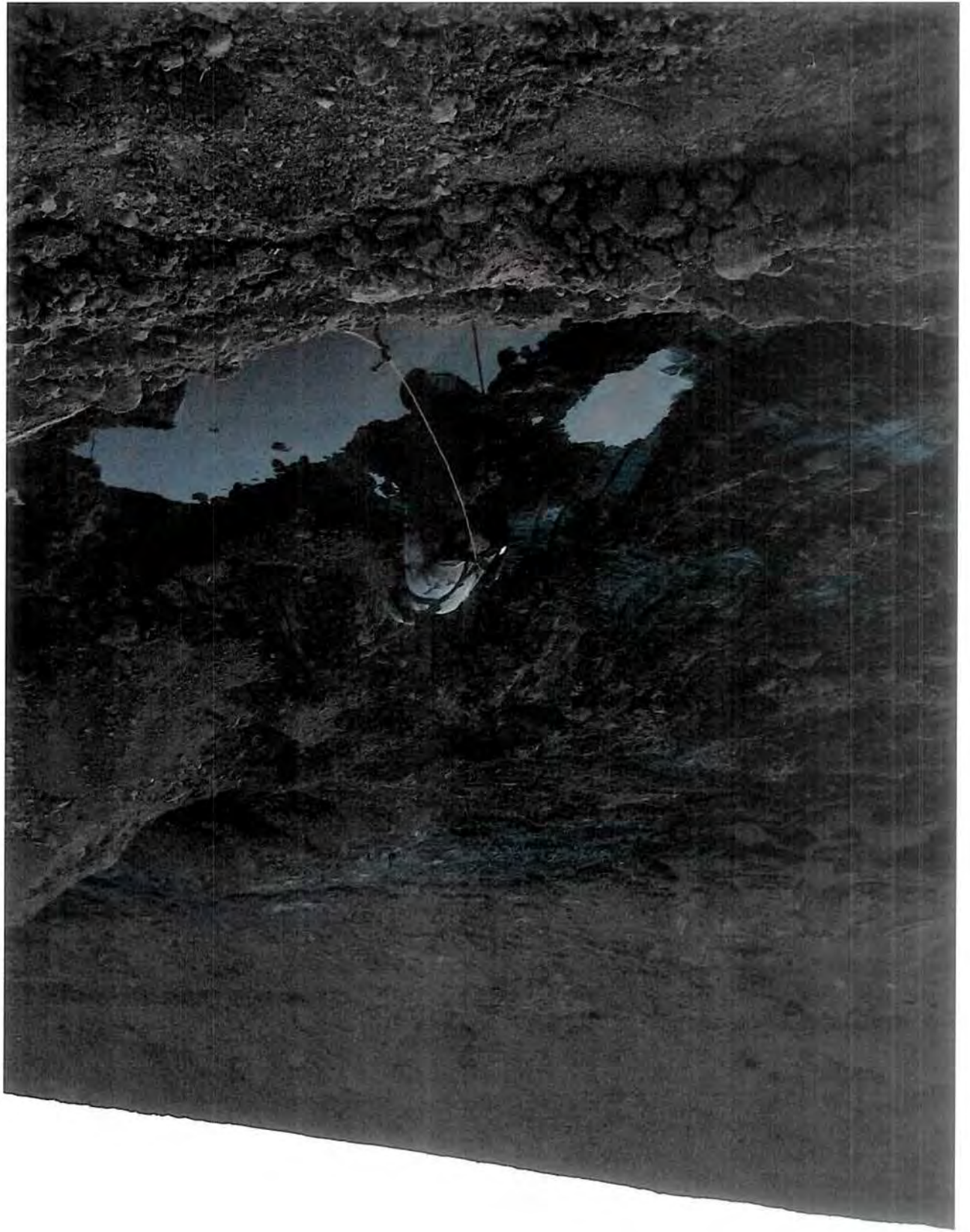
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APPENDIX
CONCENTRATION SUMMARIES
SEE ATTACHED FILES

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(U) NIMA Image Redacted

(U) NIMA Image Redacted

Table with 14 columns: ID, Location, Altitude, Direction, Speed, Concentration, Instrument, Date, and Station Name. It lists various atmospheric measurements from stations like AMAHAN PLS and VILLESHW MET.

