Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS): Transit Center at Manas (TCM), Kyrgyz Republic, Calendar Years: December 2002 to August 2012

AUTHORITY: This periodic occupational and environmental monitoring summary (POEMS) has been developed in accordance with Department of Defense (DoD) Instructions 6490.03, 6055.05, and JCSM (MCM) 0028-07, See REFERENCES.

PURPOSE: This POEMS documents the DoD assessment of base camp level Occupational and Environmental Health Surveillance (OEHS) exposure data for TCM. It presents the identified health risks and assessments along with the possible associated medical implications. The findings were based on information collected from December 2002 through August 2012 to include deployment OEHS sampling and monitoring data (e.g. air, water, and soil), field investigation and health assessment reports, as well as country and area-specific information on endemic diseases. While this assessment may reflect similar exposures and health risks pertaining to historic or future conditions at this site, the underlying data were limited to the time period(s) and area(s) sampled and thus may not reflect fluctuations or unique occurrences. It also may not have been fully representative of all the fluctuations during the timeframe. To the extent that the data allowed, this summary describes the general ambient conditions at the site and characterizes the health risks at the population–level. While useful to inform providers and others of potential health effects and associated medical implications, it does not represent an individual exposure profile. Actual individual exposures and specific resulting health effects depend on many variables and, should be addressed in individual medical records by providers as appropriate at the time of an evaluation of a unique exposure.

SITE DESCRIPTION: TCM is situated approximately 700-900 meters above sea level in the northern region of Kyrgyzstan, Southwestern Asia, approximately 25 miles northwest of the capital city of Bishkek. The terrain surrounding Manas AB is generally mountainous with sparse farmlands. U.S. and Coalition personnel routinely travel to Bishkek and the surrounding region on official business, for humanitarian or volunteer work, or for recreational purposes. In 2002 the TCM (previously known as Peter J. Ganci, Jr. Air Base) was built at the site of Frunze AB, a Cold War Soviet Backfire Bomber Base. TCM serves as a staging and support base for Operation ENDURING FREEDOM and for U.S. and Coalition troops transiting to and from Afghanistan.

SUMMARY: Summarized below were the key health risks estimates along with recommended follow-on medical actions, if any, that providers should be aware of. A Table on the following pages provides a list of all the identified health risks at TCM (Table 1). As indicated in the detailed sections that follow the table, controls that have been effectively established to reduce health risk levels have been factored into this overall assessment. In some cases, e.g. ambient air, specific controls are noted but not routinely available/feasible.

Short-term health risks & medical implications:

The following may have caused acute health effects in some personnel during deployment at TCM:

Inhalable coarse particulate matter less than 10 micrometers in diameter (PM_{10}); food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, typhoid fever, brucellosis, diarrhea-cholera, diarrhea-protozoal, hepatitis E); other endemic diseases (malaria, cutaneous/visceral leishmaniasis, Crimean-Congo hemorrhagic fever, sandfly fever, leptospirosis, Tuberculosis (TB), meningoccal meningitis rabies, Q fever); venomous animals/insects; and heat stress. For food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, typhoid fever, brucellosis, diarrhea-cholera, diarrhea-protozoal, hepatitis E), if ingesting local food and water, the health effects can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A, typhoid fever, brucellosis, hepatitis E). Risks from food/waterborne diseases may have been reduced with preventive medicine controls and mitigation, which includes hepatitis A and typhoid fever vaccinations and only drinking from approved water sources in accordance with standing CENTCOM policy. For other vector-borne endemic diseases (malaria, cutaneous leishmaniasis, Crimean-Congo hemorrhagic fever, sandfly fever, plague,west nile virus, lyme disease, tick-borne rickettsioses, tick-borne encephalitis, sindbis, California group viruses), these diseases may constitute a significant risk due to exposure to biting vectors; risk reduced to low by proper wear of the treated uniform, application of repellent to exposed skin and bed net, and appropriate chemoprophylaxis. For water contact diseases (leptospirosis) activities involving extensive contact with surface water increase risk. For respiratory diseases (Tuberculosis (TB), personnel in close-quarter conditions could have been at risk for person-to-person spread. Animal contact diseases (rabies, Q fever), pose year-round risk. For venomous animals and insects, if encountered, effects of venom varied with species from mild localized swelling (e.g. widow spider) to potentially lethal effects (e.g. Haly's Pit Viper); risks reduced by avoiding contact and proper and timely treatment. For heat stress, risk can be greater for susceptible persons including those older than 45, of low fitness level, unacclimatized, or with underlying medical conditions. Risks from heat stress may have been reduced with preventive medicine controls, work-rest cycles, and mitigation.

Air quality: PM_{10}, exposures may result in mild to more serious short-term health effects (e.g., eye, nose or throat and lung irritation) in some personnel while at this site. For PM_{10} certain subgroups of the deployed forces (e.g., those with pre-existing asthma/cardio-pulmonary conditions) are at greatest risk of developing notable health effects.

Although most effects from exposure to particulate matter should have resolved post-deployment, providers should be prepared to consider the relationship between deployment exposures and current complaints. Some individuals may have sought treatment for acute respiratory irritation during their time at TCM. Personnel who reported with symptoms or required treatment while at this site should have exposure/treatment noted in medical record (e.g., electronic medical record and/or on a Standard Form (SF) 600 (Chronological Record of Medical Care).

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Table 1. Population-Based Health Risk Estimates - TCM, Kyrgyz Republic [1, 2]

Source of Identified Health Risk[3]	Unmitigated Health Risk Estimate[4]	Control Measures Implemented	Residual Health Risk Estimate[4]
AIR			
PM_{10}	Short-term: Low, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).		Short-term: Low, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).
	Long-term: No health guidelines		Long-term: No health guidelines
Water			
Consumed	Short-term: : None Identified	Potable water used from approved sources	Short-term: None Identified
	Long-term: : None Identified		Long-term: None Identified
Water used for other purposes	Short-Term: None Identified	ROWPU treatment of source water	Short-term: None Identified
	Long-Term: Low		Long-term: Low, Some people who drink water containing alpha emitters, such as uranium, in excess of the MCL over many years may have an increased risk of getting cancer.
ENDEMIC DISEASE			
Food borne/Waterborne (e.g., diarrhea-bacteriological)	Short-term: Variable: High (bacterial diarrhea, Hepatitis A, Typhoid/Paratyphoid fever) to Moderate (Diarrhea-cholera, diarrhea-protozoal, Brucellosis and Hepatitis E). If ingesting local food/water, the health effects could have been temporarily incapacitating to personnel (diarrhea) or resulted in prolonged illness (Hepatitis A, Typhoid fever, Brucellosis, Hepatitis E).	Preventive measures included Hepatitis A and Typhoid fever vaccination and consumption of food and water used only from approved sources and routinely monitored. (MOD 11)	Short-term: Low to none
	Long-term: none identified		Long-term: none identified
Arthropod Vector Borne	Short-term: Moderate (Crimean-Congo hemorrhagic fever), Low (Malaria, leishmaniasis-cutaneous/visceral, sand fly fever, plague,west nile virus, lyme disease, tick-borne rickettsioses, tick-borne encephalitis, sindbis, California group viruses).	Preventive measures included proper wear of the treated uniform and application of repellent to exposed skin and bed net, and appropriate chemoprophylaxis.	Short-term: Low
	Long-term: Low (Leishmaniasis-visceral infection)		Long-term: Low
Water-Contact (e.g. wading, swimming)	Short-term: Moderate (Leptospirosis)	USAF employees typically do not come into contact with untreated open water	Short-term: Low to none
	Long-term: None identified		Long-term: None identified
Respiratory	Short-term: Moderate Tuberculosis (TB) and Low (meningococcal meningitis).	TB was evaluated as part of the PDHA (Post Deployment Health Assessment). A TB skin	Short-term: Low

	Long-term: TB	test was required post-deployment if potentially exposed.	Long-term: Low (TB)
Animal Contact	Short-term: Moderate (Rabies and Q-fever), Low (Anthrax and H5N1 avian influenza)	CENTCOM General Order 1B mitigates rabies exposure risks by prohibiting contact with, adoption, or feeding of feral animals. Risks are further reduced in the event of assessed contact by prompt post-exposure rabies prophylaxis IAW the CDC's ACIP guidelines.	Short-term: Low
	Long-term: Low (Rabies)		Long-term: Low (Rabies)
Aerosolized Dust or Soil Contact Disease	Short-term: Moderate (Hantavirus hemorrhagic fever with renal syndrome)		Short-term: Moderate (Hantavirus hemorrhagic fever with renal syndrome)
	Long-term: None identified		Long-term: No data available
VENOMOUS ANIMAL/ INSECTS			
Snakes, scorpions, and spiders	Short-term: Low (widow spider, scorpions), High (snakes)	Risks reduced by avoiding contact and proper and timely treatment	Short-term: Low If encountered, effects of venom varied with species from mild localized swelling (e.g. widow spider), to High and potentially lethal (e.g. Haly's Pit Viper).
	Long-term: None identified		Long-term: None identified
HEAT/COLD STRESS			
Heat	Short-term: Low to High	Risks from heat stress may have been reduced with preventive medicine controls, work-rest cycles, and mitigation	Short-term: Low to High
	Long-term: Low		Long-term: Low
Cold	Short-term: Low	Risks from cold stress may have been reduced with protective measures such as use of the buddy system in cold weather, and proper wear of protective clothing.	Short-term: Low
	Long-term: Low		Long-term: Low
NOISE			
Continuous (Flightline, Power Production) Impulse	Short-term: Low	Hearing protection used by personnel in higher risk areas	Short-term: Low
	Long-term: Low-Moderate		Long-term: Low-Moderate
Unique Incidents/ Concerns			
Pesticides/Pest Control	Short-term: Low	See section 10.4	Short-term: No data available
	Long-term: Low	See Section 10.4	Long-term: No data available

[1] This Summary Table provides a qualitative estimate of population-based short- and long-term health risk s associated with the general ambient and occupational environment conditions at TCM. It does not represent a unique individual exposure profile. Actual individual exposures and health effects depend on many variables. For example, while a chemical may have been present in the environment, if a person did not inhale, ingest, or contact a specific dose of the chemical for adequate duration and frequency, then there may have been no health risk. Alternatively, a person at a specific location may have experienced a unique exposure which could have resulted in a significant individual exposure. Any such person seeking medical care should have their specific exposure documented in an SF600.

[2] This assessment was based on specific data and reports obtained from the December 2002 through August 2012 timeframe. It was considered a current representation of general site conditions but may not reflect certain fluctuations or unique exposure incidents. Acute health risk estimates were generally consistent with field-observed health effects.

[3] This Summary Table was organized by major categories of identified sources of health risk. It only lists those sub-categories specifically identified and addressed at the site(s) evaluated. The health risks were presented as Low, Moderate, High or Extremely High for both acute and chronic health effects. The health risk level was based on an assessment of both the potential severity of the health effects that could be caused and probability of the exposure that would produce such health effects. Details can be obtained from the APHC/AIPH. Where applicable, "None Identified" was used when an exposure was identified and no health risk of either a specific acute or chronic health effects were determined. More detailed descriptions of OEH exposures that were evaluated but determined to pose no health risk are discussed in the following sections of this report.

[4] Health risks in this Summary Table were based on quantitative surveillance thresholds (e.g. endemic disease rates; host/vector/pathogen surveillance) or screening levels, e.g. Military Exposure Guidelines (MEGs) for chemicals. Some previous assessment reports may provide slightly inconsistent health risk estimates because quantitative criteria such as MEGs may have changed since the samples were originally evaluated and/or because this assessment makes use of all historic site data while previous reports may have only been based on a select few samples.

1 Discussion of Health Risks at TCM, Kyrgyz Republic by Source

The following sections describe the major source categories of potential health risk that were evaluated at TCM. For each category, the evaluation process includes identifying what, if any, specific sub-categories/health concerns were present.

2 Air

2.1 Site-Specific Sources Identified

TCM is situated in a dusty semi-arid desert environment. Inhalational exposure to high levels of dust and particulate matter, such as during high winds or dust storms may have resulted in mild to more serious short-term health effects (e.g., eye, nose or throat and lung irritation) in some personnel. Additionally, certain subgroups of the deployed forces (e.g., those with pre-existing asthma/cardio pulmonary conditions) were at greatest risk of developing notable health effects.

2.2 Particulate matter, less than10 micrometers (PM_{10})

2.2.1 Sample data/Notes:

Exposure Guidelines:
Short-term (24-hour) PM_{10} ($\mu g/m^3$): Negligible MEG=250, Marginal MEG=420, Critical MEG=600.
Long-term PM_{10} MEG ($\mu g/m^3$): Not Available.

A total of 14 valid PM_{10} air samples were collected at TCM from December 2002 – January 2004. The range of 24-hour PM_{10} concentrations was 14 $\mu g/m^3$ – 160 $\mu g/m^3$ with an average concentration of 46 $\mu g/m^3$.

2.2.2 Short-term health risks:

Low: The short-term PM_{10} health risk assessment was low based on average and peak PM_{10} concentrations and the likelihood of exposure at these hazard severity levels. A low health risk assessment for typical exposure concentrations suggests that short-term exposure to PM_{10} at TCM was expected to have little or no impact on accomplishing the mission. Daily average health risk levels for PM_{10} show no hazard for 100% of the time. Confidence in the short-term PM_{10} health risk assessment was low based on the relatively small data set (TG 230, Table 3-6).

The hazard severity was negligible for average and peak PM_{10} exposures. The results indicate that few exposed personnel (if any) are expected to have noticeable health effects during mission. Exposed personnel are expected to be able to effectively perform all critical tasks during mission operations. Minimal to no degradation of abilities to conduct complex tasks are expected.

2.2.3 Long-term health risk:

Not Evaluated-no available health guidelines. The Environmental Protection Agency has retracted its long-term standard (NAAQS) for PM_{10} due to an inability to clearly link chronic health effects with chronic PM_{10} exposure levels.

2.3 Particulate Matter, less than 2.5 micrometers ($PM_{2.5}$)

2.3.1 Sample data/Notes:

Exposure Guidelines:
Short-term (24-hour) $PM_{2.5}$ MEGs ($\mu g/m^3$): Negligible MEG=65, Marginal MEG=250, Critical MEG=500.
Long-term $PM_{2.5}$ MEGs: Negligible MEG=15, Marginal MEG=65.

There were no $PM_{2.5}$ samples collected at TCM from December 2002 through August 2012.

2.3.2 Short-term health risks:

Not evaluated, no samples collected.

2.3.3 Long-term health risks:

Not evaluated, no samples collected.

2.4 Airborne Metals from PM_{10}

2.4.1 Sample data/Notes:

Exposure Guidelines:
Long-term Lead MEG: 0.012 mg/m^3

The health risk assessment was based on average and peak concentration of 14 valid PM_{10} airborne metal samples collected at TCM from December 2002 – January 2004, and the likelihood of exposure. Lead was the only analyte above detectable limits with a concentration range of 0.00016-0.0002 mg/m3. All other samples had detected concentrations less than the analytical method limit of detection.

2.4.2 Short-term health risks:

None identified based on the available sampling data. No parameters exceeded 1-year Negligible MEGs.

2.4.3 Long-term health risks:

None identified based on the available sampling data.

2.5 Volatile Organic Compounds (VOC)

2.5.1 Sample data/Notes:

The health risk assessment was based on average and peak concentration of 14 valid volatile organic chemical (VOC) air samples collected at TCM from December 2002 – February 2004, and the likelihood of exposure. VOCs were detected in all of the samples, but most were detected at levels below the pertinent MEGs. 1,2-Dibromo-3-chloropropane was detected above the 1-year negligible MEG of 0.000000799 µg/m3. Risks are determined based on comparison to available MEGs.

2.5.2 Short and long-term health risks:

Low: 1,2-Dibromo-3-chloropropane (a soil fumigant no longer permitted for use in the United States) exceeded the 1-year negligible MEG of 0.000000799 µg/m3 in one sample collected in 2003. The measured concentration was 0.47 µg/m3. All other samples had detected concentrations less than the

analytical method limit of detection. Confidence in this risk assessment is low due to limitations in the sampling data.

3 Soil

3.1 Site-Specific Sources Identified

3.2 Sample data/Notes:

A total of 7 valid surface soil samples were collected from TCM in July and October 2004 to assess OEH health risk to deployed personnel. The primary soil contamination exposure pathways are dermal contact and dust inhalation. Typical parameters analyzed for included SVOCs, heavy metals, PCBs, pesticides, herbicides. If the contaminant was known or suspected, other parameters may have been analyzed for (i.e. total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) near fuel spills). While no parameters exceeded the MEGs, data was insufficient to fully characterize risk.

3.3 Short-term health risk:

Not an identified source of health risk. Currently, sampling data for soil are not evaluated for short term (acute) health risks**.**

3.4 Long-term health risk:

None identified based on available sample data. No parameters exceeded 1-year Negligible MEGs.

4 Water

In order to assess the health risk to US personnel from exposure to water in theater, the APHC identified the most probable exposure pathways. These were based on the administrative information provided on the field data sheets submitted with the samples taken over the time period being evaluated. Bottled water is the primary source of drinking water for all deployed personnel at TCM. 376 ECES Utilities operates and maintains 3 ROWPU systems on base located at the Main DFAC, Green Bean Cafés Hotel Alaska and in AAFES Town. The water is treated by a water filtration system consisting of a 1 and 5 micron filtration system, chlorination, and UV light disinfection. Water from this treatment system is indicated in sampling data as “main DFAC water plant” and is used for food preparation, coffee, juice reconstitution, tea, etc. The airport water distribution, maintained by the host nation, is considered non-potable and is indicated as “raw, municipal, untreated” in documentation, and is used for brushing teeth, washing clothes and taking showers.

4.1 Drinking Water: Bottled

4.1.1 Site-Specific Sources Identified

Previously, all bottled water was purchased from one of two U.S.A. Public Health Command approved sources, Almaty (Coca-Cola) in Kazakhstan, and Nestle in Uzbekistan. As of November 2010, VETCOM allowed purchase of bottled water from Almaty (Coca-Cola) in Bishkek, Kyrgyzstan. Each shipment of bottled water purchased for TCM is tested upon receipt IAW AFMAN 48-138. The monitoring includes total coliform presence/absence and E. coli. In addition, 1 broad spectrum analysis sample was collected February 2010 from Biskek Coke Plant and 2 broad spectrum analysis samples were collected February 2004 from Bishkek City.

4.1.2 Sample data/Notes:

All collected samples were below the short and long-term Negligible MEGs.

4.1.3 Short-term health risk:

None identified based on available sample data.

4.1.4 Long-term health risks

None identified based on available sample data.

4.2 Water: Treated/Disinfected

4.2.1 Site-Specific Sources Identified

ROWPU treated water is monitored to ensure compliance with potable water standards per AFMAN 48-138. Routine monitoring conducted by 376 EMDG/SGPB included bacteriological, free available chlorine (FAC) and other sanitation surveillance parameters per AFMAN 48-138. The radiological exposure guidelines indicated below are the Military Field Water Standards (MFWS) as outlined in AFMAN 48-138 (TB MED 577/NAVMED P-510-10).
Although the primary route of exposure for most microorganisms was ingestion of the contaminated water, dermal exposure to some microorganisms, chemicals, and biological contaminants may have also caused adverse health effects. Complete exposure pathways would have included drinking, brushing teeth, personal hygiene, cooking, providing medical and dental care using a contaminated water supply or during dermal contact at vehicle or aircraft wash racks.

4.2.2 Sample data/notes:

Exposure Guidelines:
Long-term MFWS: Gross Alpha: 15 pCi/L Uranium: 0.03 mg/L

25 radiological samples from 9 sampling events January 2009 - March 2012; and 14 broad spectrum analysis samples from 3 sampling events July 2004, May 2010, March 2012 were evaluated for this health risk assessment.

4 radiological samples exceeded long-term MFWS for for gross alpha (18-33 pCi/L), 2 samples exceeded long-term MFWS for uranium (0.03-0.039 mg/L).

All other analytes were not detected at levels above the short-term/long-term MEGs or MFWSs.

Records indicate that the routinely monitored parameters (pH, chlorine, bacteriological) are typically within acceptable limits. Deviations from acceptable limits are investigated and corrected as they occur. Records of these measurements are available in DOEHRS.

4.2.3 Short-term health risks

None identified based on available sample data:

4.2.4 Long-term health risks:

Low: The health risk from radionuclides in treated water at TCM was Low. All other sample analytes were below the short and long-term Negligible MEGs and MFWSs. Confidence in the risk assessment was medium because water samples are a snapshot in time and therefore may not be an accurate reflection of water quality as the system changes.

4.3 Non-Drinking Water

4.3.1 Site-Specific Sources Identified

Although the primary route of exposure for most microorganisms was ingestion of the contaminated water, dermal exposure to some microorganisms, chemicals, and biological contaminants may have also caused adverse health effects. Complete exposure pathways would have included drinking, brushing teeth, personal hygiene, cooking, providing medical and dental care using a contaminated water supply or during dermal contact at vehicle or aircraft wash racks.
The radiological exposure guidelines indicated below are the Military Field Water Standards (MFWS) as outlined in AFMAN 48-138 (TB MED 577/NAVMED P-510-10).

4.3.2 Sample data/Notes

Exposure Guidelines:
Long-term MFWS: Gross Alpha: 15 pCi/L Uranium: 0.03 mg/L

To assess the potential for adverse health effects to troops the following assumptions were made: All U.S. personnel at this location were expected to remain at this site for approximately 1 year. A conservative (protective) assumption was that personnel routinely consumed less than 5L/day of non-drinking water for up to 365 days (1-year). It was further assumed that control measures and/or personal protective equipment were not used.

A total of 16 radiological samples from 5 sampling events January 2009 - February 2010 and 1 broad spectrum analysis sample from May 2010 were evaluated for this health risk assessment.

4 radiological samples exceeded MFWS for gross alpha (15-25 pCi/L), 1 sample exceeded MFWS for uranium (0.039 mg/L).

All other analytes were not detected at levels above the short or long term MEGs and MFWS.

4.3.3 Short-term health risks:

None identified based on available sample data:

4.3.4 Long-term health risks:

Low: The health risk from radionuclides in treated water at TCM was Low. All other sample analytes were below the short and long-term Negligible MEGs and MFWS. Confidence in the risk assessment was medium because water samples are a snapshot in time and therefore may not be an accurate reflection of water quality as the system changes.

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons

No specific hazard sources were documented in Defense Occupational and Environmental Health Readiness System (DOEHRS), or the Military Exposure Surveillance Library (MESL) data portal between December 2002 and August 2012.

5.2 Depleted Uranium (DU)

No specific hazard sources were documented in DOEHRS or MESL data portal between December 2002 and August 2012.

5.3 Ionizing Radiation

Ionizing radiation sources include 2 portable x-ray units. One is located in the Medical Group and the other in Explosive Ordinance Disposal (EOD) on the Bomb Robot. Medical radiography is utilized in the EMEDS Clinic. The radiology technician is the only individual enrolled in the thermoluminescent dosimetry (TLD) program, with no exposures recorded. Radioactive materials are used in CBRN detection equipment and other generally licensed devices. All radioactive material leak testing indicates no detectable radiation.

5.4 Non-Ionizing Radiation

5.4.1 Lasers:

Aircraft are equipped with lasers. Specific health hazards associated with each laser are documented in DOEHRS. Administrative procedures are in place to reduce incidents.

5.4.2 Radio Frequency (RF) Radiation:

Aircraft and ground-based emitters have administrative processes in place to reduce the potential for exposures and ensure personnel are not within the uncontrolled environment hazard distance. Operators of these systems are aware to notify Bioenvironmental Engineering for any potential exposure to RF radiation to be investigated and documented.

6 Endemic Disease[1]

All information was taken directly from the National Center for Medical Intelligence (NCMI) (https://www.intelink.gov/ncmi/country.php?country=KGZ). Baseline Infectious Disease Risk Assessment for Kyrgyzstan - dated in 3 June 2010. This document lists the endemic disease reported in the region, its specific risks and severity and general health information about the disease. The general information on meningococcal meningitis regarding how it is transmitted from person to person came from the World Health Organization's Fact Sheet No. 141 on Meningococcal Meningitis. USCENTCOM MOD 11 (Reference 12 of this document) lists deployment requirements, to include immunization and chemoprophylaxis, in effect during the time frame covered by this POEMS.

6.1 Foodborne and Waterborne Diseases

[1] NOTE: "Risk" level refers to both severity of disease (without controls, for example vaccinations) and probability of disease based on local rates/endemic status. Diseases described are those presenting greater risk when compared with U.S. conditions. Most identified disease risks can and are being mitigated with military preventive medicine measures/policies.

Food borne and waterborne diseases in the area were potentially transmitted through the consumption of local food and water. Sanitation was poor throughout the country, including major urban areas. Local food and water sources were heavily contaminated with pathogenic bacteria, parasites, and viruses to which most U.S. Service members have little or no natural immunity. Effective host nation disease surveillance did not exist within the country. Only a small fraction of diseases were identified or reported in host nation personnel. Diarrheal diseases could have been expected to temporarily incapacitate a very high percentage of U.S. personnel within days if local food or water was consumed. Hepatitis A and typhoid fever could have caused prolonged illness in a smaller percentage of unvaccinated personnel. Vaccination was required for DOD personnel and contractors. In addition, although not specifically assessed in this document, viral gastroenteritis (e.g., norovirus) and food poisoning (e.g., Bacillus cereus, Clostridium perfringens, and Staphylococcus) may have caused significant outbreaks. Key disease risks are summarized below:

6.1.1 Diarrheal diseases (bacteriological)

Unmitigated High – Mitigated Low: Potential mitigation was in place, US personnel did not drink untreated water. Risk was typically highest following spring floods. In general, bacterial agents such as enterotoxigenic Escherichia coli, Campylobacter, Shigella, and Salmonella were the most common causes of traveler's diarrhea wherever sanitary conditions were significantly below U.S. standards. The health risk of cholera was considered in its own health risk assessment. An operationally significant attack rate (potentially over 50% per month) could have occurred among personnel consuming local food, water. Field conditions (including lack of hand washing and primitive sanitation) may have facilitated person-to-person spread and epidemics. Typically mild disease is treated in outpatient settings; with recovery and return to duty less than 72 hours with appropriate therapy. A small proportion of infections may require greater than 72 hours limited duty, or hospitalization.

6.1.2 Hepatitis A

Unmitigated High - Mitigated LOW: Unmitigated health risk to U.S. personnel was high year round. Mitigation was in place, US Personnel did not drink untreated water and vaccination with Hepatitis A vaccine is required for deployment into the CENTCOM AOR. Water consumed by US/DOD personnel was treated on military camps. Typical case involves 1 to 3 weeks of debilitating symptoms, sometimes initially requiring inpatient care; recovery and return to duty may require a month or more.

6.1.3 Typhoid / paratyphoid fever

Unmitigated High – Mitigated Low: Unmitigated health risk to U.S. personnel was high year round. Mitigation measures include mandatory Typhoid vaccination for US deployers to the CENTCOM AOR. Risk was typically highest following spring floods. Typhoid and paratyphoid were potentially acquired through the consumption of fecally contaminated food or water. Asymptomatic carriers are common with typhoid and contribute to sustained transmission. A small number of cases (less than 1% per month attack rate) could have occurred among unvaccinated personnel who consumed local food, water, or ice. Common source outbreaks may have occurred. Mitigation was in place, US personnel did not drink untreated water. Water consumed by US/DOD personnel was treated on military camps. With appropriate treatment, typhoid and paratyphoid fever are debilitating febrile illnesses typically requiring 1 to 7 days of supportive care, followed by return to duty.

6.1.4 Diarrhea - protozoal

Unmitigated Moderate – Mitigated Low: Mitigation was in place, US personnel did not drink untreated water. Water consumed by US/DOD personnel was treated on military camps. Risk was typically highest following spring floods. In general, Cryptosporidium spp., Entamoeba histolytica, and Giardia

lamblia were the most common protozoal causes of diarrhea wherever sanitary conditions are significantly below U.S. standards. A small number of cases (less than 1% per month attack rate) could have occurred among personnel consuming local food, water, or ice. Outbreaks affecting a higher percentage of personnel were possible with Cryptosporidium. Symptomatic cases varied in severity; typically mild disease demonstrating recovery and return to duty in less than 72 hours with appropriate therapy; severe cases may require 1 to 7 days of supportive care, followed by return to duty.

6.1.5 Brucellosis

Unmitigated Moderate – Mitigated Low: Mitigation was in place, U.S. Forces were provided food and water from approved sources. Brucellosis was a common disease in cattle, sheep, goats, swine, and some wildlife species in most developing countries. Humans may have contracted brucellosis through consumption of contaminated dairy products (or foods made with such products) or by occupational exposures to infected animals. The health risk from direct animal contact was likely to be highest in rural areas where livestock are present. However, the health risk from contaminated dairy products was present countrywide, including urban areas. Rare cases (less than 0.1% per month attack rate) could have occurred among personnel consuming local dairy products or having direct contact with livestock. With appropriate treatment, brucellosis is a febrile illness of variable severity, potentially requiring inpatient care; convalescence is usually over 7 days even with appropriate treatment.

6.1.6 Diarrhea - cholera

Unmitigated Moderate – Mitigated Low: Mitigation was in place to reduce the residual health risk to low. Water consumed by US/DOD personnel was treated on military camps. Unmitigated health risk to U.S. personnel was Moderate year round. Risk was greatest during warmer months when water sources dry up and there was widespread use of open irrigation canals for domestic water. Development of symptomatic cholera requires exposure to large inoculums and typically is associated with ingestion of heavily contaminated food or water. Person-to-person spread of cholera occurs very infrequently, if at all. The majority of infections (75 percent or more, depending on biotype) among healthy adults are very mild or asymptomatic. Only a small percentage of infections are severe. Rare cases (less than 0.1% per month attack rate) could have occurred among personnel consuming local food, water, or ice. Most symptomatic cases are mild, with recovery and return to duty in less than 72 hours on appropriate outpatient treatment; severe cases may require 1-7 days of supportive or inpatient care, followed by return to duty.

6.1.7 Hepatitis E

Unmitigated Moderate – Mitigated Low: Mitigation was in place to reduce the residual health risk to low, US personnel did not drink untreated water. Water consumed by US/DOD personnel was treated on military camps. Potential health risk to U.S. personnel was Moderate year round. Risk was typically highest following spring floods. Hepatitis E occurs in 4 major genotypes. Genotypes 1 and 2, found primarily in Africa and Asia, cause large numbers of sporadic cases, as well as large outbreaks. Fecal contamination of drinking water is the most common source of exposure for these genotypes. Large outbreaks are usually associated with particularly severe breakdowns in baseline sanitation, as often occurs during heavy rainfall which increases mixing of sewage and drinking water sources. Secondary household cases from person-to-person transmission are uncommon. Unlike hepatitis A, where local populations living in poor sanitary conditions are usually highly immune from childhood exposures, immunity levels for hepatitis E are often much lower, even in areas of extremely poor sanitation. Typically, outbreaks of hepatitis E occur primarily among adults. Although data is insufficient to assess potential disease rates, we could not rule out rates approaching 1 percent per month among personnel consuming local food, water, or ice. Rates may have exceeded 1 percent per month for personnel heavily exposed during outbreaks in the local population. Typical cases involve 1 to 3 weeks of

debilitating symptoms, sometimes initially requiring inpatient care; recovery and return to duty may require a month or more.

6.1.8 Short-term Health Risks:

Unmitigated Moderate to High – Mitigated Low: The overall short-term unmitigated risk associated with food borne and waterborne diseases was considered High (for bacterial diarrhea, hepatitis A, typhoid fever / paratyphoid fever) to Moderate (for diarrhea-protozoal, diarrhea-cholera, brucellosis, hepatitis E) if local food or water is consumed. Preventive Medicine measures such as vaccinations reduce the risk estimate to none (for Hepatitis A and Typhoid fever). Additionally, U.S. Forces were provided food and water from approved sources. Confidence in the health risk estimate was High

6.1.9 Long-term Health Risks:
None identified based on available data.

6.2 Arthropod Vector-Borne Diseases

During warmer months (approximately June to September), ecological conditions in rural and periurban areas support arthropod vectors, including mosquitoes, ticks, and sandflies, with variable rates of disease transmission. Because The Kyrgyz Republic lacks adequate diagnostic capability, vector-borne diseases frequently are underreported, and there is a reliance on clinical (symptom-based, vs. laboratory confirmation- based) diagnosis. Vector-borne diseases were transmitted at low or unknown levels and may have constituted a significant health risk in the absence of mitigation measures. See Section 10.4 for more information about pesticides and pest control measures.

6.2.1 Crimean-Congo hemorrhagic fever

Unmitigated Moderate – Mitigated Low: Potential health risk to U.S. personnel was Moderate year round with peak transmission from March through November, but reduced to low with mitigation measures. For U.S. personnel, risk mitigation included proper wear of treated uniforms and application of repellent to exposed skin. Risk from tick-borne transmission was limited primarily to warmer months. Risk of transmission from animal contact was present year-round. Most primary Crimean-Congo hemorrhagic fever (CCHF) infections occur as sporadic cases or clusters of cases, and are associated with tick bites or occupational contact with blood or secretions from infected animals. Outbreaks of CCHF occur infrequently, but may be associated with changes in agricultural land use that increase tick contact or incursions of susceptible populations into areas where the disease is endemic. Rare cases (less than 0.1% per month attack rate) could have occurred among personnel exposed to tick bites. Direct contact with blood and body fluids of an infected animal or person may also have transmitted infection. It is a very severe illness typically requiring intensive care with fatality rates from five to fifty percent.

6.2.2 Malaria

Low: Mitigation measures included mandated chemoprophylaxis, which when used as directed reduced malaria risks to low. Potential unmitigated risk to U.S. personnel was moderate during warmer months (typically March through November). Malaria incidents were often associated with the presence of agriculture activity, including irrigation systems and standing water, which provide breeding habitats for vectors. In the Kyrgyz Republic, rare cases (less than 0.1 percent per month attack rate) could occur among personnel exposed to mosquito bites. Malaria incidents could cause debilitating febrile illness typically requiring 1 to 7 days of inpatient care, followed by return to duty. Severe cases may require intensive care or prolonged convalescence, and fatalities can occur.

6.2.3 Leishmaniasis – cutaneous/visceral

Low: Potential health risk to U.S. personnel was Low year round. For U.S. personnel, risk mitigation included proper wear of treated uniforms, application of repellent to exposed skin, and minimizing outdoor activities (when possible) between dusk and dawn. Leishmaniasis is transmitted by sandflies. Transmission generally was limited to the warmer months. A small number of cases (less than 1% per month attack rate) could occur among personnel exposed to sandfly bites in areas with infected people, rodents, dogs, or other reservoir animals. Asymptomatic chronic infections may have occurred, which may become symptomatic years later. Cutaneous infection was unlikely to be debilitating, though lesions can be disfiguring. Definitive treatment previously required non-urgent evacuation to the continental United States; currently, not all cases require evacuation.

6.2.4 Sandfly fever

Low: Sandfly fever had a low health risk, and transmission generally was limited to the warmer months. The disease is transmitted by sandflies, which typically bite at night and breed in dark places rich in organic matter, particularly in rodent or other animal burrows. Other suitable habitats include leaf litter, rubble, loose earth, caves, and rock holes. Sandflies may be common in peridomestic settings. Abandoned dwellings, sometimes used by troops as temporary quarters, also can harbor significant numbers of sandflies. Stables and poultry pens in peridomestic areas also may harbor sandflies. Although data were insufficient to assess potential disease rates, 1 to 10 percent of personnel could have been affected per month under worst case conditions. In small groups, exposed to heavily infected sandfly populations in focal areas, attack rates could have been very high (over 50 percent). Incidents can result in debilitating febrile illness typically requiring 1 to 7 days of supportive care followed by return to duty.

6.2.5 Plague

Low: Potential health risk to U.S. personnel was Low year round. Bubonic plague typically occurs as sporadic cases among people who come in contact with wild rodents and their fleas during work, hunting, or camping activities. Outbreaks of human plague are rare and typically occur in crowded urban settings associated with large increases in infected commensal rats (Rattus rattus) and their flea populations. Some untreated cases of bubonic plague may develop into secondary pneumonic plague. Respiratory transmission of pneumonic plague is rare but has the potential to cause significant outbreaks. Close contact is usually required for transmission. In situations where respiratory transmission of plague is suspected, weaponized agent must be considered. Extremely rare cases (less than 0.01% per month attack rate) could occur. Incidence could result in potentially severe illness which may require more than 7 days of hospitalization and convalescence.

6.2.6 West Nile fever

Low: Potential health risk to U.S. personnel was Low with transmission generally limited to the warmer months. West Nile fever was present and was maintained by bird populations and multiple species of Culex mosquitoes that help to transfer the diseases from birds to humans. The majority of infections in young, healthy adults are asymptomatic although it can result in fever, headache, tiredness, and body aches, occasionally with a skin rash (on the trunk of the body) and swollen lymph glands.

6.2.7 Lyme Disease

Low: Lyme disease is a low risk with rare cases present. The Lyme disease bacterium normally lives in mice, squirrels and other small animals. It is transmitted among these animals – and to humans – through the bites of certain species of ticks. Lyme disease affects different areas of the body in varying

degrees as it progresses. The site where the tick bites the body is where the bacteria enter through the skin. As the bacteria spread in the skin away from the initial tick bite, the infection causes an expanding reddish rash that is often associated with "flu-like" symptoms. Later, it can produce abnormalities in the joints, heart, and nervous system.

6.2.8 Tick-borne rickettsioses (Spotted fever group)

Low: Tick-borne rickettsioses are a low risk with rare cases present. The disease is transmitted to humans through bites of certain species of ticks.

6.2.9 Tick-borne encephalitis

Low: Tick-borne encephalitis is a low risk with rare cases present. Ticks act as both the vector and reservoir for TBEV. The main hosts are small rodents, with humans being accidental hosts. Large animals are feeding hosts for the ticks, but do not play a role in maintenance of the virus. Infection also may follow consumption of raw milk from goats, sheep, or cows. Laboratory infections were common before the use of vaccines and availability of biosafety precautions to prevent exposure to infectious aerosols. Person-to-person transmission has not been reported. Vertical transmission from an infected mother to fetus has occurred.

6.2.10 Sindbis (and Sindbis-like virus)

Low: Sindbis is a low risk with rare cases present. The virus is transmitted by mosquitoes and is maintained in nature by transmission between vertebrate (bird) hosts and invertebrate (mosquito) vectors. Humans are infected with Sindbis virus when bitten by an infected mosquito.

6.2.11 California group viruses

Low: California group viruses, which cause California encephalitis, are a low risk with rare cases possible. These viruses are transmitted to humans by mosquitoes. California Group virus usually causes flu-like symptoms. In rare cases, they may cause encephalitis, meningitis or hemorrhagic fever.

6.2.12 Short and long-term health risks:

Low to Moderate: The unmitigated health risk estimate was low to moderate. Health risk was reduced to low by proper wear of the uniform, application of repellent to exposed skin, and appropriate chemoprophylaxis. Confidence in health risk estimate was medium.

6.3 Water Contact Diseases

Operations or activities that involved extensive water contact may have resulted in personnel being temporarily debilitated with leptospirosis in some locations. Leptospirosis health risk typically increases during flooding. In addition, although not specifically assessed in this document, bodies of surface water were likely to be contaminated with human and animal waste. Activities such as wading or swimming may have resulted in exposures to enteric diseases such as diarrhea and hepatitis via incidental ingestion of water. Prolonged water contact also may have also lead to the development of a variety of potentially debilitating skin conditions such as bacterial or fungal dermatitis.

6.3.1 Leptospirosis

Unmitigated Moderate – Mitigated Low: Mitigated to low, USAF employees typically do not come into contact with untreated open water. The disease is present in the Kyrgyz Republic but at unknown levels. Data are insufficient to assess potential disease rates, up to 1-10 percent of personnel wading or swimming in bodies of water such as lakes, streams, or irrigated fields could be affected per month. Human infection occurs through exposure to water or soil contaminated by infected animals and has been associated with wading, and swimming in contaminated, untreated open water. Leptospirosis can enter the body through cut or abraded skin, mucous membranes, and conjunctivae. Ingestion of contaminated water can also lead to infection. The acute generalized illness associated with infection can mimic other tropical diseases (for example, dengue fever, malaria, and typhus), and common symptoms include fever, chills, myalgia, nausea, diarrhea, cough, and conjunctival suffusion. Manifestations of severe disease can include jaundice, renal failure, hemorrhage, pneumonitis, and hemodynamic collapse. Recreational activities involving extensive water contact may result in personnel being temporarily debilitated with leptospirosis.

6.3.2 Short -term health risks:

Moderate: Health risk of leptospirosis was moderate mitigated to low. Confidence in the health risk estimate was medium

6.3.3 Long -term health risks:

None identified based on available data.

6.4 Respiratory Diseases

Although not specifically assessed in this document, deployed U.S. forces may have been exposed to a wide variety of common respiratory infections in the local population. These included influenza, pertussis, viral upper respiratory infections, viral and bacterial pneumonia, and others. U.S. military populations living in close-quarter conditions were at risk for substantial person-to-person spread of respiratory pathogens. Influenza was of particular concern because of its ability to debilitate large numbers of unvaccinated personnel for several days.

6.4.1 Tuberculosis (TB)

Moderate: Potential health risk to U.S. personnel was Moderate year round. Transmission typically requires close and prolonged contact with an active case of pulmonary or laryngeal tuberculosis (TB), although it also can occur with more incidental contact. The likelihood of exposure to an active case varies with the overall incidence and the degree of contact with the local population, particularly those living in conditions of crowding and poverty. Tuberculin skin test (TST) conversion rates may have been elevated over baseline for personnel with prolonged close exposure to local populations. A TST screening to detect latent infection may have been warranted in personnel with a history of prolonged close exposure to local populations. Tuberculosis exposure and infection is evaluated as part of the Post Deployment Health Assessment (PDHA) process.

6.4.2 Meningococcal meningitis

Low: Potential health risk to U.S. personnel was Low year round. However, the health risk may have been elevated during cooler months. Asymptomatic colonization and carriage of meningococcal bacteria was common worldwide, including within U.S. military populations; rare symptomatic cases may have occured periodically in military populations, regardless of geographic location.

Meningococcal meningitis is potentially a very severe disease typically requiring intensive care; fatalities may occur in 5-15% of cases.

6.4.3 Short-term health risks:

Moderate (tuberculosis) to **Low** (for meningococcal meningitis). Confidence in the health risk estimate was Medium

6.4.4 Long-term health risks:

Low: Long-term risk to tuberculosis was low. Confidence in the health risk estimate is Medium.

6.5 Animal-Contact Diseases

6.5.1 Rabies

Moderate: Potential health risk to U.S. personnel was Moderate year round. Rabies is transmitted by exposure to virus-laden saliva of an infected animal, typically through bites. Prevalence in feral and wildlife populations was well above U.S. levels due to the lack of organized control programs. Personnel bitten by potentially infected reservoir species may have developed rabies in the absence of appropriate prophylaxis. The circumstances of the bite should have been considered in evaluating individual health risk; in addition to dogs and cats, bats or wild carnivores should also have been regarded as rabid unless proven otherwise. General Order 1B mitigated rabies risk by prohibiting contact with or adoption or feeding of feral animals. Very severe illness with near 100% fatality rate could have occurred in the absence of post-exposure prophylaxis. Typically the time period from exposure to the onset of symptoms is 2 – 12 weeks, but can rarely take several years.

6.5.2 Anthrax

Low: Potential health risk to U.S. personnel was Low year round. Anthrax is a naturally occurring infection of livestock and wild herbivores with a worldwide distribution. Rare cases (less than 0.1% per month attack rate) could have occurred among personnel with occupational-type exposure to livestock or wild herbivores, hides, wool products from these species, as well as handling or consumption of undercooked meat. In the absence of such exposures, the health risk was essentially zero. Inhalation cases raise the possibility of weaponized agent. Cutaneous and gastrointestinal anthrax are the most common forms of naturally occurring anthrax. The health risk of naturally acquired inhalation (pulmonary) anthrax is remote. Cutaneous anthrax typically requires 1 to 7 days of supportive care with subsequent return to duty; gastrointestinal anthrax typically requires hospitalization, and has a high fatality rate if untreated. Inhalation anthrax is very severe, often requiring intensive care; fatalities may occur even in treated cases.

6.5.3 Q-Fever

Moderate: Potential health risk to U.S. personnel was Moderate year round. Rare cases were possible among personnel exposed to aerosols from infected animals, with clusters of cases possible in some situations. Significant outbreaks (affecting 1-50%) could have occurred in personnel with heavy exposure to barnyards or other areas where animals are kept. Unpasteurized milk may also have transmitted infection. The primary route of exposure is respiratory, with an infectious dose as low as a single organism. Incidence could result in debilitating febrile illness, sometimes presenting as pneumonia, typically requiring 1 to 7 days of inpatient care followed by return to duty.

6.5.4 H5N1 avian influenza

Low: Potential health risk to U.S. personnel was Low. Although H5N1 avian influenza (AI) is easily transmitted among birds, bird-to-human transmission is extremely inefficient. Human infections have occurred on a very rare basis and have been associated with activities involving close, direct contact with infected poultry, such as plucking, slaughter, or other handling. There is no health risk from consumption of properly cooked poultry products. Human-to-human transmission appears to be exceedingly rare, even among relatively close contacts. Extremely rare cases (less than 0.01% per month attack rate) could have occurred. Incidence could have resulted in very severe illness with fatality rate higher than 50 percent in symptomatic cases.

6.5.5 Short-term health risks:

Variable (Low to Moderate): Low short-term health risk for H5N1 avian influenza, and anthrax due to rare occurrence to Moderate for rabies, and Q-fever. Confidence in the health risk estimate was High.

6.5.6 Long-term health risks:

Low: The long term risk for rabies was Low.

6.6 Aerosolized Dust or Soil Contact Disease

6.6.1 Hantavirus hemorrhagic fever with renal syndrome (HFRS)

Moderate: Hantaviruses are carried and transmitted by rodents. People can become infected with these viruses and develop HFRS after exposure to aerosolized urine, droppings, or saliva of infected rodents or after exposure to dust from their nests. Transmission may also occur when infected urine or these other materials are directly introduced into broken skin or onto the mucous membranes of the eyes, nose, or mouth. In addition, individuals who work with live rodents can be exposed to hantaviruses through rodent bites from infected animals. Transmission from one human to another may occur, but is extremely rare.

6.6.2 Short term health risks

Moderate: Moderate short-term risk due to rare occurrence. Confidence in risk estimate is medium.

6.6.3 Long-term health risks**:**

None identified based on available data.

7 Venomous Animal/Insect

All information was taken directly from the Clinical Toxinology Resources web site (C from the University of Adelaide, Australia and from the Armed Forces Pest Management Board Living Hazards Database (http://www.afpmb.org/content/living-hazards-database). The species listed below have home ranges that overlap the location of Kyrgyz Republic and may have presented a health risk if they were encountered by personnel. Personnel at TCM experience minimal sightings or contact. See Section 10.4 for more information about pesticides and pest control measures.

7.1 Spiders

- Latrodectus dahlia (widow spider): Severe envenoming possible, potentially lethal. However, venom effects are mostly minor and even significant envenoming is unlikely to be lethal.

7.2 Scorpions

- Mesobuthus caucasicus, Mesobuthus eupeus: There are a number of dangerous Buthid scorpions, but also others known to cause minimal effects only. Without clinical data it is unclear where this species fits within that spectrum.

7.3 Snakes

- Gloydius halys (Haly's Pit Viper), Gloydius intermedius (Central Asian Pit Viper): Severe envenoming possible, potentially lethal. Bites may cause moderate to severe coagulopathy and haemorrhagins causing extensive bleeding.

- Vipera renardi (Tien Shan Moutain Meadow Viper), Vipera Ursinii (Orsini's Viper): Severe envenoming possible, potentially lethal. Bites may cause mild to severe local effects, shock & coagulopathy.

- Naja oxiana (Central Asian Cobra): Severe envenoming possible, potentially lethal. Bites can cause systemic effects, principally flaccid paralysis.

7.4 Short-term health risk:

Low to High: If encountered, effects of venom varied with species from mild localized swelling (e.g. widow spider) to potentially lethal effects (e.g. Haly's Pit Viper). See effects of venom above. Confidence in the health risk estimate was low (TG 230 Table 3-6).

7.5 Long-term health risk:

None identified.

8 Heat/Cold Stress

TCM is situated approximately 700-900 meters above sea level in the northern region of Kyrgyzstan, Southwestern Asia, approximately 25 miles northwest of the capital city of Bishkek. The terrain surrounding TCM is generally mountainous with sparse farmlands. Bishkek has a continental climate with dry hot summers.

8.1 Heat

Average daily peak temperature during the summer months (June – September) is 92°F with an average monthly peak temperature of above 80°F. The health risk of heat stress/injury based on temperatures alone is Low (< 78 °F) from October – April, Moderate (78-81.9°F) in May and September, High (82-87.9°F) in June and extremely high (≥ 88°F) from July-August. However, work intensity and clothing/equipment worn pose greater health risk of heat stress/injury than environmental factors alone (Goldman, 2001).

Personnel are educated on dangers of heat stress, water intake and work/rest cycles. Wet Bulb Globe Temperatures recorded over the summer were moderate.

8.1.1 Short-term health risk:

Low to High: High health risk of heat injury in unacclimatized personnel from June to August, and Low

from September to May. The risk of heat injury was reduced through preventive measures. Because the occurrence of heat stress/injury is strongly dependent on operational factors (work intensity and clothing), confidence in the health risk estimate was low (TG 230, Table 3-6).

8.1.2 Long-term health risk:

Low: Long-term health implications from heat injuries are rare but can occur, especially from more serious injuries such as heat stroke. However, the health risk may be greater to certain susceptible persons–those older (i.e., greater than 45 years), in lesser physical shape, or with underlying medical/health conditions. The long-term health risk was Low; confidence in the health risk estimates was medium (TG 230, Table 3-6).

8.2 Cold

Even on warm days there can be a significant drop in temperature after sunset by as much as 40 °F. There is a risk of cold stress/injury when temperatures fall below 60 °F, which can occur from October – April. The health risk assessment for non-freezing cold injuries (chilblain, trench foot, and hypothermia) is Low based on historical temperature and precipitation data. Frostbite is unlikely to occur because temperatures rarely drop below freezing. However, personnel may encounter significantly lower temperatures during field operations at higher altitudes. As with heat stress/injuries, cold stress/injuries are largely dependent on operational and individual factors instead of environmental factors alone. With protective measures in place the health risk assessment is low for cold stress/injury; confidence in the health risk estimate is medium.

8.2.1 Short-term health risks:

Low: The health risk of cold injury is Low. Confidence in the health risk estimate is medium.

8.2.2 Long-term health risk:

Low: The health risk of cold injury is Low. Confidence in the health risk estimate is high

9 Noise

9.1 Continuous

Preventive Medicine Base Camp Assessments at TCM indicate the potential for hazardous noise exposure when working on or near the flightline and/or industrial shops. Individual workplace noise measurements can be found in DOEHRS. Appropriate hearing protection is provided for all individuals in shops which generate or are exposed to hazardous noise.

9.1.1 Short-term health risks:

Low: Short-term risk of noise injury with appropriate hearing protection use is Low. Confidence in the health risk assessment is medium (TG 230, Table 3-6).

9.1.2 Long-term health risks:

Low-Moderate: Long-term risk of noise injury with appropriate hearing protection use is Low to Moderate. Confidence in the health risk assessment is medium (TG 230, Table 3-6).

9.2 Impulse

Some potential for impulse noise may occur from individual workplace equipment. Impulse noise-generating equipment is evaluated during routine workplace surveillance and hearing protection devices are being used when required. Individual workplace noise measurements can be found in DOEHRS.

9.2.1 Short-term health risks:

Low: Short-term health risk of noise injury with appropriate hearing protection use is Low. Confidence in the health risk assessment is medium (TG 230, Table 3-6).

9.2.2 Long-term health risks:

Low-Moderate: Long-term risk of noise injury with appropriate hearing protection use is Low to Moderate. Confidence in the health risk assessment is medium (TG 230, Table 3-6).

10 Unique Incidents/Concerns

10.1 Potential environmental contamination sources

DoD personnel are exposed to various chemical, physical, ergonomic, and biological hazards in the course of performing their mission. These types of hazards depend on the mission of the unit and the operations and tasks which the personnel are required to perform to complete their mission. The health risk associated with these hazards depends on a number of elements including what materials are used, how long the exposure last, what is done to the material, the environment where the task or operation is performed, and what controls are used. The hazards can include exposures to heavy metal particulates (e.g. lead, cadmium, manganese, chromium, and iron oxide), solvents, fuels, oils, and gases (e.g. carbon monoxide, carbon dioxide, oxides of nitrogen, and oxides of sulfur). Most of these exposures occur when performing maintenance task such as painting, grinding, welding, engine repair, or movement through contaminated areas. Exposures to these occupational hazards can occur through inhalation (air), skin contact, or ingestion; however exposures through air are generally associated with the highest health risk.

10.2 Waste Sites/Waste Disposal

Regulated hazardous medical waste (red-bagged) is being collected and incinerated on site. The medical incinerator is operated and maintained by contractors. Solid waste is primarily being disposed of through a host nation contractor. Currently, proper handling, storage, and disposal of industrial waste generated on base are coordinated at the unit level with long term storage at the hazardous material/waste storage site. No obvious signs of major spills or tank leakage were noted. Chemical latrines are pumped out by trucks and waste is disposed off base. No specific health risks associated with these waste management operations have been identified.

10.3 Fuel/petroleum products/industrial chemical spills:

No significant incidents have occurred at TCM regarding fuel, petroleum or industrial chemical spills.

10.4 Pesticides/Pest Control:

There is a contracted pesticide operation on TCM. Pesticide use in this location is minimal and limited to traps and sprays for common pests. There are no ground requirements for use of herbicides/pesticides.

10.4.1 Short-term and Long-term health risks

Low: Short-term and long term health risk is Low. Confidence in the health risk assessment is medium (TG 230 Table 3-6).

11 References[2]

1. Armed Forces Pest Management Board Living Hazards Database: http://www.afpmb.org/content/living-hazards-database

2. Casarett and Doull's Toxicology: the Basic Science of Exposures, Chapter 2- Principles of Toxicology; Fifth Edition, McGraw Hill, New York.

3. Clinical Toxinology Resources: http://www.toxinology.com/. University of Adelaide, Australia.

4. Defense Occupational and Environmental Health Readiness System (referred to as the DOEHRS-EH database) at https://doehrs-ih.csd.disa.mil/Doehrs/.

5. Department of Defense (DoD) Instruction 6490.03, Deployment Health, 2006.

6. DoDI 6055.05, Occupational and Environmental Health, 2008.

7. DoD MESL Data Portal: https://mesl.apgea.army.mil/mesl/. Some of the data and reports used may be classified or otherwise have some restricted distribution.

8. Goldman RF. 2001. Introduction to heat-related problems in military operations. In: Textbook of military medicine: medical aspects of harsh environments Vol. 1, Pandolf KB, and Burr RE (Eds.), Office of the Surgeon General, Department of the Army, Washington DC.

9. Joint Staff Memorandum (MCM) 0028-07, Procedures for Deployment Health Surveillance, 2007.

10. Modification 11 to United States Central Command Individual Protection and Individual, Unit Deployment Policy, 2 December 2011.

11. National Center for Medical Intelligence (NCMI): https://www.intelink.gov/ncmi/index.php.

12. Occupational and Environmental Health Site Assessment (OEHSA), Transit Center at Manas, Updated July/August 2012.

13. Technical Bulletin, Sanitary Control and Surveillance of Field Water Supplies, 2010. (AFMAN 48-138/TB MED 577/NAVMED P-510-10)

14. USA PHC TG230, June 2010 Revision.

15. USACHPPM 2008 Particulate Matter Factsheet; 64-009-0708, 2008.

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[2] NOTE. The data is currently assessed using the 2010 TG230. The general method involves an initial review of the data which eliminates all chemical substances not detected above 1-yr negligible MEGs. Those substances screened out are not considered acute or chronic health hazards so are not assessed further. For remaining substances, acute and chronic health effects are evaluated separately for air, water (soil is only evaluated for long term risk). This is performed by deriving separate short-term and long term population exposure level and estimates (referred to as population exposure point concentrations (PEPC)) that are compared to MEGs derived for similar exposure durations. If less than or equal to negligible MEG the risk is Low. If levels are higher than negligible then there is a chemical-specific toxicity and exposure evaluation by appropriate SMEs, which includes comparison to any available marginal, critical or catastrophic MEGs. For drinking water 15 L/day MEGs are used for the screening while site specific 5-15 L/day are used for more detailed assessment. For nondrinking water (such as that used for personal hygiene or cooking) the 'consumption rate' is limited to 2 L/day (similar to the EPA) which is derived by multiplying the 5 L/day MEG by a factor of 2.5. This value is used to conservatively assess non drinking uses of water.

12 Where Do I Get More Information?

If a provider feels that the Service member's or Veteran's current medical condition may be attributed to specific OEH exposures at this deployment location, he/she can contact the Service-specific organization below. Organizations external to DoD should contact DoD Force Health Protection and Readiness (FHP & R).
Army Institute of Public Health Phone: (800) 222-9698. http://phc.amedd.army.mil/
Navy and Marine Corps Public Health Center (NMCPHC) (formerly NEHC) Phone: (757) 953-0700. http://www-nehc.med.navy.mil
U.S. Air Force School of Aerospace Medicine (USAFSAM) (formerly AFIOH) Phone: (888) 232-3764. http://www.wpafb.af.mil/afrl/711hpw/usafsam.asp
DoD Force Health Protection and Readiness (FHP & R) Phone: (800) 497-6261. http://fhp.osd.mil