

Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Transit Center at Manas (TCM) Bishkek-Manas, Kyrgyz Republic
Calendar Years: (2002 to 2014)

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 Department of Defense (DoD) assessment of Occupational and Environmental Health (OEH) risk for the Transit Center at Manas (TCM), Bishkek-Manas. It includes the TCM, Bishkek-Manas, in the immediate vicinity where US Personnel lived or worked. It presents a qualitative estimate of population-based health risks identified at this location and their potential medical implications. The report is based on information collected from 1 December 2002 through 6 June 2014 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.

This assessment assumes that environmental sampling at the TCM, Bishkek-Manas during this period was performed at representative exposure points selected to characterize health risks at the *population-level*. Due to the nature of environmental sampling, the data upon which this report is based may not be fully representative of all the fluctuations in environmental quality or capture unique occurrences. While one might expect health risks pertaining to historic or future conditions at this site to be similar to those described in this report, the health risk assessment is limited to 1 December 2002 through 6 June 2014.

The POEMS can be useful to inform healthcare providers and others of environmental conditions experienced by individuals deployed to the TCM, Bishkek-Manas during the period of this assessment. However, it does not represent an individual exposure profile. Individual exposures depend on many variables such as; how long, how often, where and what someone is doing while working and/or spending time outside. Individual outdoor activities and associated routes of exposure are extremely variable and cannot be identified from or during environmental sampling. Individuals who sought medical treatment related to OEH exposures while deployed should have exposure/treatment in their medical record on a Standard Form (SF) 600 (Chronological Record of Medical Care).

Health protective exposure assumptions are used in the assessment of all health risks, i.e. the resident population is assumed to be constantly exposed to environmental conditions. Small groups of personnel assigned to the TCM, Bishkek-Manas may be at greater risk than the general population due to operational requirements; these groups are identified when appropriate.

SUMMARY: Conditions with an estimated health risk of Moderate or greater are summarized in Table 1. Table 2 provides population based risk estimates for identified OEH conditions at the TCM, Bishkek Manas. As indicated in the detailed sections that follow Table 2, controls established to reduce health risk were factored into this assessment. In some cases, e.g. ambient air, specific controls are noted, but not routinely available/feasible. *Navigable links have been imbedded in both tables and the discussion sections of the POEMS so that the reader can easily move back and forth between the summary tables and detailed discussions*

POEMS

**Table 1: Summary of Occupational and Environmental Conditions
with MODERATE or Greater Health Risk**

Short-term health risks & medical implications:

Exposures associated with the following environmental stressors may be associated with potential acute health effects in some personnel during deployment at the TCM, Bishkek-Manas:

Inhalable coarse particulate matter less than 10 micrometers in diameter (PM₁₀); 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), meningococcal 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: PM₁₀, 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 PM₁₀ 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)).

(To be reviewed by a medical provider)

Long-term health risks & medical implications:

Exposures associated with the following environmental stressors may be associated with potential chronic health effects in some personnel after deployment at the TCM, Bishkek-Manas. The following may be associated with long term health effects in some individuals who deployed to the TCM, Bishkek-Manas and other military facilities in the immediate vicinity.

Inhalation of dust: Fine particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) are routinely present in the air in Kyrgyzstan at higher concentrations than would typically be experienced in the United States. The long-term risk related to exposure to PM 2.5 was low in 2014. Individuals who routinely worked outdoors during this period and inhaled PM_{2.5} at levels present at the camps may have developed health conditions such as chronic bronchitis, reduced lung function and asthma. Individuals with a history of asthma or pre-existing cardiopulmonary disease are likely at greatest risk. At this time, there are no specific recommended post-deployment medical surveillance evaluations for individuals with particulate exposures. Providers should consider individual health status (e.g., any underlying conditions/susceptibilities) and unique individual OEH exposures (such as welding fumes and burn pit smoke) when addressing individual concerns. Although short-term effects from exposure to dust should have resolved post-deployment, providers should consider the relationship between potential deployment exposures and current complaints.

(To be reviewed by a medical provider)

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}

Source of Identified Health Risk ³	Unmitigated Health Risk Estimate ⁴	Control Measures Implemented ⁵	Residual Health Risk Estimate ⁴
Air			
Particulate matter less than 10 microns in diameter (PM₁₀) (see paragraph 2.3)	Short-term: Low based on available data. Daily levels vary, acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects are possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).	Most personnel live in air conditioned buildings. For those not working in air condition spaces, minimize time outdoors, and keep doors or tent flaps closed.	For particulate matter (PM), control measures have limited efficacy. Thus the residual risk may be similar or identical to unmitigated risk. Low, limited data exist upon which to base a health risk assessment.
	Long-term: Health guidelines not defined		Long-term: Health guidelines not defined
Particulate matter less than 2.5 microns in diameter (PM_{2.5}) (see paragraph 2.4)	Short-term: Insufficient data exist from 2002-2013 upon which to base a health risk assessment. From 2014, the health risk associated with typical PM _{2.5} exposures was low. The majority of the time no acute health effects such as eye, nose, or throat irritation from exposure was anticipated to have occurred. Mild acute (short-term) health effects were possible for those individuals who spent much of their time outdoors. Existing medical conditions (e.g., asthma or respiratory diseases) may be exacerbated.	Limit strenuous physical activities when air quality is poor, minimize time outdoors, and keep doors, windows and tent flaps closed.	Short-term: Low. (For particulate matter (PM), control measures have limited efficacy. Thus the residual risk may be similar or identical to unmitigated risk).
	Long-term: Insufficient data exist from 2002 - 2013 upon which to base a health risk assessment. From 2014, the health risk associated with typical PM _{2.5} exposures was moderate. At the moderate risk level, a small percentage of individuals may have been at increased risk of developing chronic health conditions. These conditions include reduced lung function, chronic bronchitis, chronic obstructive pulmonary disease (COPD), asthma, and other cardiopulmonary diseases. Those with a history of asthma or pre-existing cardiopulmonary disease have a higher risk for developing these chronic conditions.		Long-term: Moderate. For particulate matter (PM), control measures have limited efficacy. Thus the residual risk may be similar or identical to unmitigated risk.
Airborne Metals (see paragraph 2.5)	Short-term: None identified, no/insufficient data exist upon which to base a health risk assessment. Long-term: None identified, insufficient data exist upon which to base a health risk assessment.		For metals associated with ambient dust, control measures have limited efficacy. Thus the residual risk may be similar or identical to unmitigated risk Short-Term: None identified, insufficient data exist upon which to base a health risk assessment.

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}			
Source of Identified Health Risk³	Unmitigated Health Risk Estimate⁴	Control Measures Implemented⁵	Residual Health Risk Estimate⁴
			Long-term: None identified, insufficient data exist upon which to base a health risk assessment.
Volatile Organic Compounds (VOC) (see paragraph 2.6)	Short-term: Low, insufficient data exists upon which to base a health risk assessment.	Locate any open pit burning downwind of occupied areas of the camp. Fuel spills cleaned up quickly if they occur.	Based on efficacy of control measure implement regarding the specific source Short-term: Low; insufficient data exist upon which to base a health risk assessment.
	Long-term: None identified, based on available sampling data.		Long-term: None identified, insufficient data exists upon which to base a health risk assessment.
Soil			
Soil (see paragraph 3)	Short-Term: None Evaluated: Currently, Soil sampling data not evaluated for short-term (acute) health risks.	Locate open pit burning downwind of occupied areas of the camp. Fuel spills cleaned up quickly if they occur.	Short-Term: None evaluated: Currently, Soil sampling data not evaluated for short Term (acute) Health Risks.
	Long-term: None identified no/insufficient data exist upon which to base a health risk assessment, target analytes detected below corresponding MEG values.		Long-term: None identified, no/insufficient data exist upon which to base a health risk assessment.
Water			
Consumed Water (Water Used for Drinking) (see paragraph 4.2)	Short-term: Low. U.S. Army Veterinarian Service approved bottled water was provided for drinking. No analytes were detected above the 14 day 15L/day negligible drinking water military exposure guidelines.	U.S. Army Veterinary Service approved bottled water and Preventive Medicine/ Army Veterinary approved packaged water were supplied and consumed except for a brief period during the onset of the war. Active and ongoing drinking water surveillance program.	Short-term: Low
	Long-term: None identified based on available sampling data.		Long-term: None identified based on available sampling data.
Water used for other purposes (non-drinking) (see paragraph 4.3)	Short-term health risk: Low based on available sampling data.	Water surveillance programs which routinely monitor for disinfectant residual and bacteriological contamination.	Short-term health risk: Low based on available sampling data.
	Long-term health risk: Low based on available sampling data.		Long-term health risk: Low based on available sampling data.
Military Unique			
Chemical Biological, Radiological Nuclear (CBRN) Weapons (see paragraph 5.1)	Not evaluated/none identified, no data exist upon which to base a health risk assessment.		Not evaluated/none identified, no data exist upon which to base a health risk assessment.
	Not evaluated/none identified, no data exist upon which to base a health risk assessment.		Not evaluated/none identified, no data exist upon which to base a health risk assessment.
Depleted Uranium (DU) (see paragraph 5.2)	Not evaluated/none identified, no data exist upon which to base a health risk assessment.		Not evaluated/none identified, no data exist upon which to base a health risk assessment.
	Not evaluated/none identified, no data exist upon which to base a		Not evaluated/none identified, no data exist upon which to base a

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}

Source of Identified Health Risk ³	Unmitigated Health Risk Estimate ⁴	Control Measures Implemented ⁵	Residual Health Risk Estimate ⁴
	health risk assessment.		health risk assessment.
Ionizing Radiation (see paragraph 5.3)	Short-term: Low based on available data.	Time, distance, shielding.	Short-term: Low based on available data.
	Long-term: Low based on available data.	Medical x-ray technician was enrolled in the TLD program.	Long-term: Low based on available data.
Non-ionizing Radiation (see paragraph 5.4)	Short-term: None identified, no/insufficient data exist upon which to base a health risk assessment.	Administrative controls specific to each laser system.	Short-term: None identified, no/insufficient data exist upon which to base a health risk assessment.
	Long-term: None identified, no/insufficient data exist upon which to base a health risk assessment.	Administrative controls and hazard distances for RFR emitters.	Long-term: None identified, no/insufficient data exist upon which to base a health risk assessment.
Endemic Disease			
Gastrointestinal (same as Food borne/Waterborne (e.g., diarrhea-bacteriological) (see paragraph 6.2))	Short-term: Low for viral gastroenteritis. Low for foodborne/waterborne diseases when mitigated, moderate-high when unmitigated.	Standard Preventive Medicine measures: immunizations (hepatitis A and typhoid fever), the consumption of food and water from approved sources, and habitability inspections to ensure cleanliness/sanitation.	Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi.
	If ingesting <u>unapproved</u> local food/water, the health effects can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A, typhoid fever, brucellosis, hepatitis E). Viral gastroenteritis can present due to a high rate of personnel turnover and shared dining, berthing, bathroom facilities, and working spaces. Long-term: Low. The majority of gastrointestinal diseases do not cause prolonged illness.		Short-term: Low for viral gastroenteritis. Low for foodborne/waterborne diseases when mitigated, moderate-high when unmitigated. Based on disease incident reporting from Kyrgyzstan, bacterial and protozoal gastrointestinal diseases, cholera, brucellosis, and hepatitis E infections present a low risk. Long-term: Low, based on disease incident reporting from Kyrgyzstan.
Arthropod Vector Borne (see paragraph 6.3)	Short-term: Competent vectors and reservoirs for disease are present. Risk is low for sandfly fever, West Nile fever, typhus and plague.	Standard Preventive Medicine measures: proper wearing of insecticide-treated uniforms and the application of insect repellent to the skin, chemoprophylaxis in accordance with COCOM policy (i.e., malaria), removal of vector harborages within camps, and the application of pesticides.	Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi.
	Risk is moderate when unmitigated but reduced to low with mitigation measures for Crimean-Congo hemorrhagic fever. Risk is moderate when unmitigated but reduced to low with mitigation measures for malaria. Risk is low for Leishmaniasis.		Short-term: Risk is low for sandfly fever, West Nile fever, typhus and plague. Risk is moderate when unmitigated but reduced to low with mitigation measures for Crimean-Congo hemorrhagic fever. Risk moderate when unmitigated but reduced to low with mitigation measures for malaria. Risk is low for Leishmaniasis.

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}

Source of Identified Health Risk ³	Unmitigated Health Risk Estimate ⁴	Control Measures Implemented ⁵	Residual Health Risk Estimate ⁴
	<p>Long-term: Risk is moderate when unmitigated but reduced to low with mitigation measures for vivax malaria.</p> <p>Risk is low for Leishmaniasis. It is possible to be infected during deployment with leishmaniasis, but not to have clinically evident disease until redeployed.</p>		<p>Long-term: Risk is moderate when unmitigated but reduced to low with mitigation measures for vivax malaria.</p> <p>Risk is low for Leishmaniasis.</p>
Water-Contact (e.g. wading, swimming) (see paragraph 6.4)	<p>Short-term: moderate when unmitigated, reduced to low with mitigation. The occurrence of flooding after heavy rainfall can facilitate the spread of leptospirosis already present in the soil.</p>	<p>Avoidance of fresh water sources, such as puddles/standing water, drainage areas, etc. Treatment (primarily chlorination) process for non-drinking water (water used for bathing, cooking, etc.).</p>	<p>Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi.</p> <p>Short-term: Low based on disease incident reporting from Kyrgyzstan.</p>
	<p>Long-term: None identified based on available data.</p>		<p>Long-term: None based on available data.</p>
Respiratory (see paragraph 6.5)	<p>Short-term: Moderate for upper respiratory infections and TB. The high rate of personnel turnover, shared dining, berthing, recreational facilities, and working spaces may allow for the easy transmission of upper respiratory infections, including influenza.</p>	<p>Influenza immunizations are given either before or during deployment. Local and third country national workers/contractors are required to complete health screening prior to employment. Potential tuberculosis exposure is addressed in the Post Deployment Health Assessment.</p>	<p>Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi.</p> <p>Short-term: Moderate for upper respiratory infections and tuberculosis.</p>
	<p>Long-term: Low. The majority of respiratory diseases do not cause prolonged illness.</p>		<p>Long-term: Low based on disease incident reporting from Kyrgyzstan.</p>
Animal Contact (see paragraph 6.6)	<p>Short-term: Low for anthrax, moderate for rabies and Q-fever.</p>	<p>Standard Preventive Medicine measures, as well as COCOM policy, generally prohibit contact with, adoption, or feeding of feral animals. Immunizations for anthrax and rabies (rabies vaccination and/or immune globulin given if clinically directed).</p>	<p>Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi.</p> <p>Short-term: Low for anthrax, moderate for rabies and Q-fever based on disease incident reporting from Kyrgyzstan.</p>
	<p>Long-term: Low based on disease incident reporting from Kyrgyzstan.</p>		<p>Long-term: Low based on disease incident reporting from Kyrgyzstan.</p>
Venomous Animal/Insects			
<p>Snakes, scorpions, and spiders (see paragraph 7)</p>	<p>Short-term: Low to high for spiders, low for scorpions and snakes. If encountered, effects of venom vary</p>	<p>Standard Preventive Medicine measures, such as the reduction of harborages for these</p>	<p>Based on efficacy of control measure as evidenced by lack of disease(s) reported in various</p>

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}

Source of Identified Health Risk ³	Unmitigated Health Risk Estimate ⁴	Control Measures Implemented ⁵	Residual Health Risk Estimate ⁴
	with species from mild localized swelling to potentially lethal (e.g. <i>Gloydius halys</i>).	animals, as well as education on how to avoid them (shake out boots before donning, etc.), reduce the risk of exposure.	medical surveillance data bases e.g. TMDS, MERS, DRSi. Short-term: Low to high for spiders, low for scorpions and snakes.
	Long-term: No long-term health risk identified		Long-term: No long-term health risk identified
Heat/Cold Stress			
Heat (see paragraph 8.2)	Short-term: Low for acclimatized individuals. Moderate risk of heat injury in summer months (June-September) for unacclimatized personnel.	Adequate periods of acclimatization for newly reporting or returning personnel. Adjustment of work-rest cycles based on monitoring of climatic conditions.	Based on efficacy of control measure and incidence of heat/cold injury(ies) reported in various medical surveillance data bases e.g. TMDS, MERS, DRSi. Short-term: Low/Moderate
	Long-term: Low.		Long-term: Low.
Cold (see paragraph 8.3)	Short-term: Moderate. The risk for cold stress/injuries is largely dependent on clothing/equipment worn, operational work intensity and individual factors rather than environmental factors alone.	Provision of adequate foul weather clothing. Appropriate work/warming cycles during cold weather.	Short-term: Moderate.
	Long-term: Moderate.		Long-term: Moderate.
Noise			
Noise (Continuous) (Flightline, Power Production) (see paragraph 9.1)	Short-term: Low based on available data.	Use of hearing protection. Labeling noise hazardous areas. Leadership enforcement of compliance with available PPE.	Based on efficacy of control measure typically practiced.
	Long-term: Low to moderate based on available data.		Short-Term: Low based on available data.
	Short-term: Not evaluated. Insufficient data exist upon which to base a risk assessment.		Long-term: Low to moderate based on available data.
Impulse (see paragraph 9.2)	Long-term: Not evaluated. Insufficient data exist upon which to base a risk assessment.		Short-term: Not evaluated.
			Long-term: Not evaluated.
Unique Concerns			
Special Incidents (see paragraph 10.1)	None identified. Insufficient data exist upon which to base a health risk assessment for open air burning for refuse disposal by civilian populations in the immediate areas surrounding the TCM.		Short and long-term: No data available.
	None identified. Insufficient data exist upon which to base a health risk assessment for the December 2013 class III TS-1 jet fuel spill.		Short and long-term: No data available.
Potential Environmental Contamination (see paragraph 10.2)	Short and long-term risks: Low. Insufficient data exist upon which to base a risk assessment.		Short and long-term risks: Low. Insufficient data exist upon which to base a risk assessment.

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek, Manas, Kyrgyz Republic^{1,2}			
Source of Identified Health Risk³	Unmitigated Health Risk Estimate⁴	Control Measures Implemented⁵	Residual Health Risk Estimate⁴
Pesticides/Pest Control (see paragraph 10.3)	Short and long-term risks: Low based on available data.		Short and long-term risks: Low based on available data.
Asbestos (see paragraph 10.4)	Short-term: Low based on available data and as long as the materials remain intact.		Short-term: Low based on available data and as long as the materials remain intact.
	Long-term: None identified, insufficient data exists upon which to base a health risk assessment.		Long-term: None identified, insufficient data exists upon which to base a health risk assessment.
Lead-Based Paint (see paragraph 10.4)	Short-term: Low based on available data and as long as the materials remain intact.		Short-term: Low based on available data and as long as the materials remain intact.
	Long-term: None identified, insufficient data exists upon which to base a health risk assessment.		Long-term: None identified, insufficient data exists upon which to base a health risk assessment.
Burn Pits (see paragraph 10.5)	Short-term: Low based on available data.	Control measures may have included locating burn pits downwind of prevailing winds, increased distance from living and working areas when possible, and improved waste segregation and management techniques	Short-term: Low based on available data.
	Long-term: Not evaluated, no available health guidelines.		Long-term: Not evaluated, no available health guidelines.

POEMS
Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek-Manas, Kyrgyz Republic
<p>¹ This Summary Table provides a qualitative estimate of population-based short-and long-term health risks associated with the occupational and environment conditions at the TCM, Bishkek-Manas, and other locations frequented by U.S. military personnel in the immediate vicinity of the TCM, Bishkek-Manas, Kyrgyz Republic. It does not represent an individual exposure profile. Actual individual exposures and health effects depend on many variables. For example, while a chemical may be present in the environment, if a person does not inhale, ingest, or contact a specific dose of the chemical for adequate duration and frequency, then there may be no health risk. Alternatively, a person at a specific location may experience a unique exposure, such as at the burn pit, which could result in a significant individual exposure. Any such person seeking medical care should have their specific conditions of exposure documented on Form SF600.</p> <p>² This assessment is based on specific environmental sampling data and reports obtained from 1 December 2002 through 6 June 2014. Sampling locations are assumed to be representative of exposure points for the camp population, but may not reflect all the fluctuations in environmental quality or capture unique exposure incidents.</p> <p>³ This Summary Table is organized by major categories of identified sources of health risk. It only lists those sub-categories specifically identified and addressed at the TCM, Bishkek-Manas. The health risks are presented as Low, Moderate, High or Extremely High for both acute and chronic health effects. The risk level is based on</p>

POEMS

Table 2: Population-Based Health Risk Estimates – the TCM, Bishkek-Manas, Kyrgyz Republic

an assessment of both the potential severity of the health effects that could be caused and probability that exposure would occur at a level to produce such health effects. Details can be obtained from the Army Public Health Center. More detailed descriptions of OEH exposures that were evaluated are discussed in the following sections of this report.

⁴ Risks in this Summary Table are based on quantitative surveillance thresholds (e.g. review of disease surveillance data) or screening levels (e.g. Military Exposure Guidelines (MEGs) for chemicals). Some previous assessment reports may provide slightly inconsistent 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 few samples.

⁵ All OEH risk estimates represent residual risk after accounting for preventive controls in place. Occupational exposures and exposures to endemic diseases are greatly reduced by preventive measures in place. For environmental exposures related to airborne dust, there are limited preventive measures available and available measures have little efficacy in reducing exposure to ambient conditions.

SITE DESCRIPTION: The TCM, Bishkek-Manas was situated approximately 700-800 meters above sea level in the northern region of Kyrgyzstan, Southwestern Asia, approximately 16 miles north-northwest of the capital city of Bishkek and 6 miles from the Kazakhstan border. The region lies in the high mountain valley of the Chu River, between the main ranges of the Tien Shan Mountains and the northernmost ridgeline with sparse farmland. Numerous rivers from the Tien Shan join the Chu River which flows into the Issyk Kul Lake approximately 105 miles to the east.

In 2002 the TCM (previously known as Peter J. Ganci, Jr. Air Base; Ganci Air Base; and Manas Air Base) was built at the site of Frunze Air Base, a Cold War Soviet Backfire Bomber Base. The TCM served as a staging and support base for Operation ENDURING FREEDOM and for U.S. and Coalition personnel transiting to and from Afghanistan through its closure on 6 June 2014. The assigned base population averaged 1800 U.S. and Coalition personnel with up to 3.5K personnel transiting through the base daily through February 2014. In March 2014, forces began to downsize in preparation for base closure. The Manas International Airport and other Kyrgyz hardened maintenance and administrative facilities were collocated on the “Ops Town” area of the TCM. Two pavement/asphalt plants, the Free Economic Zone, and the Vasilyevskiy Radioactive Disposal Facility were located within approximately two miles of the base.

Personnel lived in tents or prefabricated housing dependent upon the timeframe that they were assigned to the TCM. Working conditions were dependent upon duty assignment but included tents, hardened facilities, and outdoor areas. U.S. and Coalition personnel routinely traveled to Bishkek and the surrounding region on official business, for humanitarian or volunteer work, or for recreational purposes.

Local Climate: The weather in Northern Kyrgyzstan is characterized by a continental climate with warm to hot summers, cold winters and moderate temperatures throughout the remainder of the year. The region generally experiences minimal precipitation year-round to exclude heavy snowfalls during the winter. Summer is typically warm, clear and dry with temperatures averaging between 77°F and 91°F but peak temperatures can exceed 100°F. Winters in the region are typically cold and harsh with average temperatures below freezing but may drop as low as -20°F. Snowfall varies with an average accumulation of 6-8 inches per month. Prevailing winds come from the southeast most of the year (May through January) at an average of 6 to 8 knots. Prevailing winds are out of the west the remainder of the year (February through April). Calm conditions occur often, especially in December and January, but downslope winds occur often at night as well. Foehn winds, locally called harmsils, occur all year and can become fairly strong with peak gusts averaging from 29 to 49 knots. Pollution and dust haze are the main causes of restricted visibility year round. Restricted visibility and pollution are most notable during the winter months, averaging 20 days per month. Soil at the TCM consists of silt-sand. Soils consisting

mainly of silts and clays often percolate poorly, causing water to pool on the surface of the ground during rain events and remain for extended periods of time until it evaporates.

1 Discussion of Health Risks at the Transit Center at Manas (Bishkek-Manas), Kyrgyz Republic by Source

The following sections provide additional information about the OEH conditions summarized above. All risk assessments were performed using the methodology described in the US Army Public Health Command Technical Guide 230, *Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel* (USAPHC TG 230). All OEH risk estimates represent residual risk after accounting for controls measures in place. Occupational exposures and exposures to endemic diseases are greatly reduced by preventive measures. For environmental exposures related to airborne dust, there are limited preventive measures available, and available measures have little efficacy in reducing exposure to ambient conditions.

The following contains examples of information that may be provided about health risk assessments (short or long term). Each section, **air, water, soil, etc.** is divided into five parts:

Sample data (Overall total samples collected, Periods of sampling, range of concentration and overall average, and/or (if any) for each satellite sites around the hub site),

Approach (including a brief description about how the data were treated/evaluated, including the relevance of peak and average values to acute or chronic Military Exposure Guidelines (MEGs),

Risk Summary (a brief summary of the overall short/long-term risk with an explanation of specific periods during which the risk is higher or lower than the overall risk for the site),

Medical Implications (a brief description of clinical outcomes may have been seen while in theater resulting from short-term exposures or those that may be seen in the future related to chronic, low dose exposures, and

Confidence in the Risk Assessment (based on the number of samples, frequency and consistency of sampling events and consistency of the results within the dataset.

2 Air

2.1 Area-Specific Sources Identified

- a. The TCM is situated in a semi-arid desert environment resulting in dusty conditions throughout most of the year. Prevailing winds come from the southeast most of the year (May through January) at an average of 6 to 8 knots. Prevailing winds are out of the west the remainder of the year (February through April). Foehn winds, locally called harmsils, occur all year and can become fairly strong with peak gusts averaging from 29 to 49 knots. Pollution and dust haze are the main causes of restricted visibility year round. Restricted visibility and pollution are most notable during the winter months, averaging 20 days per month.
- b. There are four known off site industrial sources present in the immediate vicinity of the TCM, Bishkek-Manas. Two pavement/asphalt plants, the Free Economic Zone, and the Vasilyevskiy Radioactive Disposal Facility were located within approximately two miles of the base. Onsite electric power generation by numerous tactical generators located throughout the camp base may have contributed air pollutants such as nitrogen oxide, carbon monoxide, hydrocarbons and particulate. A central power generation plant was constructed which reduced the use of tactical generators; however, exhaust products associated with diesel fuel for electric power generation persist.
- c. Kyrgyzstan is an underdeveloped country lacking clean and reliable power generating systems. As a result, the use of coal and biomass fuels (crop residues, dung, straw and wood) is common for cooking and

heating during the cooler seasons. Biomass fuels release respirable particles, carbon monoxide and nitrogen oxides into the air contributing significantly to air pollution.

d. Open air burning was used consistently by the civilian population in the immediate areas surrounding the TCM, Bishkek-Manas for refuse disposal during the period covered by this POEMS. The estimated volume of waste disposed of through burning per day is unknown. Smoke plumes from refuse burning periodically impacted sectors of the TCM, Bishkek-Manas, depending on the prevailing winds.

e. Vehicle and aircraft emissions can be other major contributors to the air pollution. Emissions from military vehicles and aircrafts as well as vehicles in surrounding communities, especially in developing countries, may have significant impacts on air quality.

2.2 Particulate Matter

Particulate matter (PM) is a complex mixture of extremely small particles suspended in the air. PM includes solid particles and liquid droplets emitted directly into the air by sources such as: power plants, motor vehicles, aircraft, tactical generators, construction activities, fires, and natural windblown dust. PM can include sand, soil, metals, volatile organic compounds, allergens, and other compounds such as nitrates or sulfates that are formed by condensation or transformation of combustion exhaust. PM composition and particle size vary considerably depending on the source. Generally particulate matter of health concern is divided into two fractions: PM₁₀, which includes coarse particles with a diameter of 10 micrometers or less (0.0004 inches or one-seventh the width of a human hair), and fine particles less than 2.5 micron (PM_{2.5}), which can reach the deepest regions of the lungs when inhaled. Exposure to excessive PM is linked to a variety of potential health effects.

2.3 Particulate Matter, less than 10 microns (PM₁₀)

2.3.1 Exposure Guidelines:

Short-term (24-hour) PM₁₀ (mg/m³):
 Negligible MEG=0.250
 Marginal MEG=0.420
 Critical MEG=0.600

Long-term PM₁₀ MEG (mg/m³):
 Not defined.

2.3.2 Sample data:

A total of 14 valid PM₁₀ air samples were collected from 2002 – 2004. The range of 24-hour PM₁₀ concentrations was 0.014 mg/m³ – 0.160 mg/m³ with an average concentration of 0.046 mg/m³.

A total of 36 valid PM₁₀ air samples were collected from April 2014 – May 2014. The range of 24-hour PM₁₀ concentrations was 0.0324 mg/m³ – 0.173 mg/m³ with an average concentration of 0.066 mg/m³.

2.3.3 Short-term (acute) health risk for PM₁₀:

Approach: To assess acute risk associated with PM₁₀, the peak concentrations of PM₁₀ were used to arrive at the acute risk for the period from 2002 to 2014. The peak concentrations for the two sampling periods ranged from 0.160 mg/m³ to 0.173 mg/m³. A risk estimate for the highest peak concentration was calculated. If the highest peak posed a moderated or higher health risk, risk estimates for the next highest concentrations were repeated until the calculated risk dropped to low. Peaks with an estimated risk of moderate or higher are reported as periods of elevated risk.

Risk Summary: The hazard severity for short-term PM₁₀ exposures was negligible. Based on average (0.046 mg/m³ (2002-2004) and 0.066 mg/m³ (2014) and the 2014 peak (0.173 mg/m³) PM₁₀ sample concentrations, as compared with the short-term negligible MEG (0.250 mg/m³). Based on the short-term (acute) health risk

assessment for PM₁₀ sample concentrations and the likelihood of exposure from 2002 to 2014, the health risk hazard is low.

Medical implications: At the low risk level, a small number of individuals may have experienced eye, nose, and throat irritation and sought medical attention assuming the levels detected during the limited sampling are representative of general environmental conditions. In most of these individuals, the symptoms would have been mild and temporary requiring no medical treatment. During periods when airborne dust concentrations were higher than those detected, more individuals may have been affected and the severity of symptoms increased. It is likely that more individuals may have sought medical attention with higher airborne dust concentrations. Symptoms associated with exposure to PM₁₀ would be expected to resolve after exposure ceased. Health effects in persons with pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.

Confidence in the Risk Assessment: Low based on the on the important data gaps, inconsistency of sampling, and limited PM₁₀ air sampling data available during the period of POEMS.

2.3.4 Long-term (chronic) health risk for PM₁₀:

Health guidelines are not defined for PM₁₀. The United States Environmental Protection Agency has retracted its long-term standard (NAAQS) for PM₁₀ due to an inability to clearly link chronic health effects with PM₁₀ exposures.

[Return to Table 2](#)

2.4 Particulate Matter, less than 2.5 microns (PM_{2.5})

2.4.1 Exposure Guidelines:

Short-term (24-hour) PM_{2.5} MEGs (mg/m³):
 Negligible MEG=0.065
 Marginal MEG=0.250
 Critical MEG=0.500

Long-term (1year) PM_{2.5} MEGs (mg/m³):
 Negligible MEG=0.015
 Marginal MEG=0.065.

2.4.2 Sample data:

From April 2014 to May 2014, 36 valid ambient air PM_{2.5} samples were collected at the TCM, Bishkek-Manas for PM_{2.5}. Air sampling could not be accomplished from November – March at the TCM, Bishkek-Manas due to equipment limitations associated with cold temperatures. No PM_{2.5} air sampling data was available for 2002 to 2013.

The 2014 sampling range of 24-hour PM_{2.5} concentrations was 0.00625 mg/m³ – 0.0483 mg/m³ with an average concentration of 0.0209 mg/m³.

2.4.3 Short-term (acute) health risk for PM_{2.5}:

Approach: To assess acute risk associated with PM_{2.5}, the peak concentrations of PM₁₀ were used to arrive at the acute risk for the period from April 2014 to May 2014. The peak concentrations ranged from 0.00625 mg/m³ to 0.0483 mg/m³. A risk estimate for the highest peak concentration was calculated. If the highest peak posed a moderated or higher health risk, risk estimates for the next highest concentrations were repeated until the calculated risk dropped to low. Peaks with an estimated risk of moderate or higher are reported as periods of elevated risk.

Risk Summary: The hazard severity for short-term PM_{2.5} exposures was negligible (USAPHC TG 230, Exhibit 3-1). Based on average (0.0209 mg/m³) and peak (0.0483 mg/m³) of PM_{2.5} air sample concentrations, as compared with the short-term negligible MEG (0.065 mg/m³). 25 of the 36 samples collected from April to May

2014 exceeded the short-term negligible MEG but did not exceed the marginal MEG. The short-term health risk assessment for PM_{2.5} sample concentrations and the likelihood of exposure at these health risk hazard is low.

Medical implications:

At the low risk level, a small percentage of individuals may experience short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath. Some individuals might seek outpatient medical care although most individuals would have experienced only mild effects which would have typically resolve when exposure ceased. A small number of individuals may experience more pronounced effects such as decreased lung function and worsening of pre-existing medical conditions such as asthma.

Confidence in the risk assessment: Confidence in the risk assessment is low based on the limited PM_{2.5} air sampling data available and inconsistency of sampling.

2.4.4 Long-term (chronic) health risk for PM_{2.5}:

Approach: For chronic health risk, it was assumed that the longest deployment lasted twelve to fifteen months. To assess chronic risk associated with PM_{2.5}, the overall yearly average concentration of PM_{2.5} was used to arrive at a long term health risk for 2002 through 2014. The average PM_{2.5} concentration during this period was 0.0209 mg/m³, with a range from 0.00625 mg/m³ to 0.0483 mg/m³. If sufficient data were available, the risk assessment was then repeated using the annual average concentrations for each year PM_{2.5} data exist.

Risk Summary: Negligible (USAPHC TG 230, Exhibit 3-1). Based on average (0.0209 mg/m³) and peak (0.0483 mg/m³) PM_{2.5} sample concentrations, as compared with the long-term 1 year negligible MEG (0.015 mg/m³). The long-term health risk assessment for PM_{2.5} sample concentrations and the likelihood of exposure from 2002-2014, the health risk hazard is low to moderate.

Medical implications: At the low to moderate risk level, a small percentage of individuals may have been at increased risk of developing chronic health conditions. Repeated exposures to airborne concentrations of PM_{2.5} that carry a low to moderate long-term health risk may increase the probability for development of chronic health conditions in generally healthy troops. These conditions include reduced lung function, chronic bronchitis, chronic obstructive pulmonary disease (COPD), asthma, and certain cardiopulmonary diseases. Those with a history of asthma or pre-existing cardiopulmonary disease have a higher risk for exacerbating these chronic conditions. However, as the majority of the population at the TCM, Bishkek-Manas did not work outdoors for more than eight to twelve hours/day the risk for these chronic conditions is likely overstated.

Confidence in the risk assessment: Confidence in the risk assessment is low based on the limited PM_{2.5} air sampling data available and inconsistency of sampling between 2002 and 2014.

[Return to Table 2](#)

2.5 Airborne Metals

2.5.1 Sample data:

From 2002 through 2004, metals analysis was performed on 14 valid ambient air particulate matter samples (including PM₁₀ and PM_{2.5}) collected at the TCM, Bishkek-Manas. Lead was the only analyte above detectable limits, with concentrations ranging from 0.16 ug/m³ to 0.2 ug/m³ (lead 14-day and 1-year negligible MEG: 12.2 ug/m³). No metals were detected above their corresponding military exposure guidelines published in the USAPHC TG 230.

From April 2014 through May 2014, metals analysis was performed on 36 valid ambient air particulate matter samples (including PM₁₀ and PM_{2.5}) collected at the TCM, Bishkek-Manas. Lead (16 of 36 samples) and nickel (23 of 36 samples) were the only metals detected above their detectable limits. Lead concentrations ranged from 0.07 ug/m³ to 0.14 ug/m³ (lead 14-day and 1-year negligible MEG: 12.2 ug/m³); nickel concentrations ranged

from 0.069 ug/m³ to 1.397 ug/m³ (nickel 14-day and 1-year negligible MEG: 367 ug/m³). No metals were detected above their corresponding military exposure guidelines published in the USAPHC TG 230.

Approach:

For screening purposes, both peak and average concentrations of all airborne metals detected were compared to their corresponding 1-year negligible MEG. Risk estimates based on the USAPHC TG 230 methodology are calculated for any compound detected at a concentration greater than its 1-year MEG in 5% or more of the samples collected.

Risk Summary: None based on available sampling data.

2.5.2 Short-term (acute) health risk:

No short-term health risk was identified based on available sampling data.

2.5.3 Long-term (chronic) Health risk:

No long-term health risk was identified based on available sampling data.

Confidence in the risk assessment: Confidence in this risk assessment is low based on limited sampling data available and inconsistency of sampling.

[Return to Table 2](#)

2.6 Volatile Organic Compounds (VOC)

2.6.1 Sample data:

From 2002 to 2004, 14 valid air samples were collected at the TCM, Bishkek-Manas for VOC analysis. 1,2-Dibromo-3-chloropropane was detected in one sample above the 1 year negligible MEG (0.000000799 ug/m³). The measured concentration of 1,2-Dibromo-3-chloropropane was 0.47 ug/m³. No other VOCs were detected above their corresponding military exposure guidelines published in the USAPHC TG 230.

In May 2014, 11 valid VOC air samples were collected at the TCM, Bishkek-Manas for VOC analysis. 9 of the 11 samples exceeded the USAPHC 1 year negligible MEG for acrolein (0.137 ug/m³). The range of 24-hour acrolein concentrations ranged from 0.37 ug/m³ – 0.64 ug/m³ with an average concentration of 0.504 ug/m³. No other VOCs were detected above their corresponding military exposure guidelines published in the USAPHC TG 230.

Approach: Typically, most VOC sampling is either associated with a specific source or incident driven. Data of this type, especially when there is sparse sampling data exist, is generally not representative of exposure to an entire camp population.

For screening purposes, peak and average concentrations of all airborne VOCs detected were compared to their corresponding 1-year negligible MEG. Short-term risk estimates based on the USAPHC TG 230 methodology are determined for any compound detected at a concentration greater than its 1-year MEG and long-term risk estimates were determined where VOC were detected above their respective 1-year MEG in 5% or more of the samples collected.

Risk Summary: Sampled concentrations generally will not be representative of possible exposures to the entire camp population due to dispersion as distance from the point source(s) increases. Rather, sample results only represent the potential exposure of the population residing or working in proximity to the sample location. The

overwhelming majority of other personnel will have different exposures based upon their specific distance from the source.

2.6.2 Short-term (acute) health risk of VOCs:

1,2-Dibromo-3-chloropropane is better known as DBCP, the active ingredient in the nematicide Nemagon, also known as Fumazone. It is a soil fumigant that is no longer permitted for use in the United States.

Acrolein is a combustion by-product released from the burning of trees, other plants, gasoline, oil, other fossil fuels and biodiesel. Acrolein has a disagreeable odor and breaks down rapidly in the air by reacting with other chemicals and sunlight. Most individuals can smell acrolein at a concentration of 0.6 mg/m³. One of the most common sources of exposure to acrolein is tobacco smoking.

Medical Implications: Breathing small amounts of acrolein can cause watering of the eyes, burning of the nose and throat, and decreased breathing rate. These symptoms go away when exposure stops. Studies indicate that very slight eye irritation and annoyance/discomfort begin at about 0.2 mg/m³, and nose/throat irritation and a decrease in respiratory rate at approximately 0.7 mg/m³. Concentration of acrolein detected at the TCM, Bishkek-Manas were below the threshold concentrations known to cause nose and throat irritation, but above the threshold concentration known to cause eye irritation.

Confidence in the risk assessment: Low for both acrolein and 1,2-Dibromo-3-chloropropane based on the limited air sampling data available, inconsistency of sampling and the laboratory's limited capability to quantify some VOC compounds.

2.6.3 Long-term (chronic) health risk of VOCs:

Approach:

For screening purposes, sample results were compared with each of the corresponding 1 year negligible MEG for acrolein and the 1 year negligible MEG for 1,2-dibromo-3-chloropropane published in the USAPHC TG 230.

Risk Summary: Negligible. No long-term health risk was identified based on available sampling data.

Medical Implications: No identified or expected adverse health outcomes.

Confidence in risk estimate: Confidence in the risk assessment is low based on the 9 samples collected during a short period of time at the TCM, Bishkek-Manas.

[Return to Table 2](#)

3 Soil

3.1 Site-Specific Sources Identified

3.1.2 During July 2004 and October 2004, a total of 7 valid surface soil samples were collected at TCM, Bishkek-Manas. Laboratory analysis of all soil samples included semi-volatile organic compounds (SVOCs), heavy metals, polychlorinated biphenyls (PCB), pesticides, herbicides and radionuclides. The primary exposure pathways associated with soil are dermal contact and incidental ingestion. Individuals involved in construction, maintenance and post fire clean-up activities were at greatest potential for exposure to soil. These individuals comprise a relatively small proportion of the overall camp population.

Approach:

Currently, sampling data for soil are not evaluated for short term (acute) health risks.

For long-term health risk, sample results were compared with each of the corresponding long-term MEGs published in the USAPHC TG 230 screening purposes. Compounds detected without a single exceedance of the 1-year MEG were excluded from further consideration. Long-term risk estimates were based on the probability of exposure to the concentrations detected.

3.1.3 Short-term (acute) health risk for soil:

Risk Summary: Insufficient data exists upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Medical Implications: None known.

Confidence in the Risk Assessment: Not applicable, soil is not evaluated for short-term health risks.

3.1.4 Long-term (chronic) health risk for soil:

Long-Term: Insufficient data exists upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Risk Summary: Based on available data, no soil constituents exceeded MEGs, however data was insufficient upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Medical Implications: None.

Confidence in risk estimate:

Confidence in the risk assessment is low based on 7 samples collected across regional soils.

[Return to Table 2](#)

4 Water

4.1 Site-Specific Sources Identified

In order to assess the health risk to US personnel from exposure to water in theater, the U.S. Army Public Health Command 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 the TCM (Bishkek-Manas). The 376 Expeditionary Civil Engineering Squadron (ECES) Utilities flight operated and maintained three commercial reverse osmosis water purification units (ROWPUs) at the following locations: the Main DFAC, the Hotel Alaska AAFES Green Bean, and the Main AAFES Green Bean. The water was treated by varying micron filtration systems. The Main DFAC ROWPU supplied “potable” water to the Main DFAC for food preparation, coffee, juice reconstitution, tea, etc. ROWPUs were supplied by the Bishkek Municipal Airport water distribution system.

The Bishkek Municipal Airport water distribution system, maintained by the host nation, was utilized for personal hygiene such as hand washing, showering, brushing teeth, laundry and cleaning. The system consisted of four wells, a water treatment facility and a piped distribution system. The source water is an aquifer of unknown depth. Wells are drilled between 140 and 240 meters deep. This system was classified as non-potable and is indicated as “raw”, “municipal”, and “untreated” in documentation. Disinfection was not controlled by military personnel.

Historically, commercial bottled water was provided for drinking at all U.S. military sites in Kyrgyzstan. At least three vendors were identified as having provided bottled water at some point during military operations in

Kyrgyzstan including: Calipso, Bishkek Coca Cola plant; Almaty (Coca Cola) in Kazakhstan; and Nestle in Uzbekistan.

It is assumed that 100% of all U.S. personnel at the TCM (Bishkek-Manas) will be directly exposed to Reverse Osmosis Water Purification Unit (ROWPU) treated and disinfected fresh bulk water, since this classification of water was primarily used for food preparation, cooking, preparing coffee and tea, juice reconstitution, and ice at the Main DFAC and at the AAFES Green Bean locations. During base closure operations, it was discovered that the ROWPU piping at the Main DFAC was not properly routed through the system and walls; faucets labeled as “potable” maintained free-flowing water when the ROWPU unit was completely shut down for repairs. It is highly probable that personnel were exposed to water that would otherwise be classified as non-potable. Field data sheets indicate that bottled water is the only approved source of drinking water.

Based on the information provided from the field, all samples for untreated water were associated with source water for treatment and no exposure pathways were associated with those samples. Therefore, untreated samples are not assessed as potential health hazards.

4.2 Consumed Water (Water for drinking or cooking consumption)

4.2.1 Sample data/notes:

All bottled water purchased for the TCM, Bishkek-Manas was sampled for total coliform presence/absence and *E. coli* presence/absence upon receipt and prior to distribution IAW TB MED 577/AFMAN 48-138_IP. At least 208 bottles were tested between August and December of 2012, 611 bottles were tested in 2013, and 157 bottles were tested in 2014. Exact numbers of bottles tested was not available for 2002-2011.

Two broad spectrum analysis samples were collected in February 2004 from Bishkek City. A broad spectrum analysis sample and radiological sample was collected from Bishkek Coca Cola plant in February 2010. Radiological sampling was performed on three separate lots of delivered bottled water on 19 April 2014.

4.2.2 Short-term (acute) health risk for drinking bottled water:

Approach: In order to determine acute health risk associated with consumption of bottled water the following assumptions were made.

- Camp residents ingest 15 liters of bottled water per day or less.
- All U.S. personnel at this location were expected to remain at this site for approximately 1 year.

Based on these assumptions, the maximum detected concentration for each analyte was compared to its respective 14-day, Negligible MEG for consumption of up to 15 liters of water per day (15L/day) and/or the short-term Field water standards published in TB MED 577, Sanitary Control and Surveillance of Field Water Supplies.

Risk Summary: Based on the above approach, the short-term risk associated with consumption of bottled water at the TCM, Bishkek-Manas is low.

Medical implications: No medical implications are expected from consuming water at the concentrations detected at the TCM, Bishkek-Manas.

Confidence in the risk assessment: Despite the (relatively limited) number of bottled water samples, confidence in the risk assessment is high because US Army veterinary personnel performed regular audits of all bottled water suppliers to ensure consistency of quality throughout their deployment.

4.2.3 Long-term (chronic) health risk:

Approach: Bottled water was supplied to the TCM, Bishkek-Manas in distinct lots and from multiple vendors. Thus it is inappropriate to average analytical results across the spectrum of water samples/suppliers. As a result, the maximum detected concentration for each analyte was used to perform the long-term health risk screening. This process could result in overestimation of the long-term health risk as it assumes that camp residents consume water at the maximum detected concentration consistently during their deployment.

Risk Summary: None identified based on available sample data. All collected samples were below the short (or respective 1-year, 15 L/day drinking water MEG) and/or long-term Negligible MEGs.

Medical implications: None identified based on available sample data. All collected samples were below the short and long-term Negligible MEGs.

Confidence in the risk assessment: Confidence in the risk assessments associated with coliform and *E. coli* is high. Due to the relatively limited number of bottled water samples tested for radionuclides, confidence in the risk assessment is medium. US Army veterinary personnel performed regular audits of all bottled water suppliers to ensure consistency of quality throughout the deployment.

[Return to Table 2](#)

4.3 Water for Non-Drinking/Other purposes (RO and other sources of treated water)

4.3.1 Sample data/notes:

From 2002 through 2014, RO treated and disinfected fresh water (referred to as source water in documentation) samples were collected at the TCM, Bishkek-Manas. Water samples were analyzed for inorganic compounds, VOC, SVOC, radionuclides and various physical characteristics. Preventive medicine surveillance for microbiological contaminants (coliforms/*E.coli*) is standard operating procedure, but data associated with bacteriological analyses was not available from all years.

From January 2009 to April 2014, 45 radiological samples from 16 sampling events were collected at the TCM Bishkek-Manas from RO treated and untreated water sources; 18 broad-spectrum analysis samples from four sampling events were collected in July 2004, May 2010, March 2012 and October 2013 at the TCM, Bishkek-Manas and evaluated for this health risk assessment.

4.3.2 Short-term (acute) and long-term (chronic) health risks associated with water uses other than drinking:

Approach: In order to assess the health risk associated with water uses other than drinking, the following assumptions were made:

- RO treated water was used primarily for cooking, tea/coffee, and personal hygiene purposes.
- Deployments lasted is service specific (Army personnel 9 months, AF personnel 6 months and Navy personnel from 12 to 15 months).
- The primary routes of exposure associated with RO treated water were ingestion through prepared food and drinks, incidental ingestion through personal hygiene (i.e., brushing teeth/oral hygiene) and dermal contact when showering.
- Camp residents ingest far less than 5 liters (food preparation) of RO treated water per day.
- Disinfected fresh water was intended to be used only for showering and hand washing.

Based on guidance provided in USAPHC Technical Guide 230, *Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel* (USAPHC TG 230), any compound with a peak concentration less than or equal to 2.5 times the 14-day negligible MEG for consuming 5 liters of water per day/ (5-L/day) may be eliminated from further consideration. If a 14 day, 5-L/day negligible MEG was not available, the more conservative 1-year, 5-L/day negligible was used for screening purposes.

4.3.2.1 RO Treated Water (used for cooking and personal hygiene).

4.3.2.2 Sample data/notes:

Exposure Guidelines (Military LTP Standards/MCL):

Gross alpha particle activity: 15 pCi/L

Uranium: 30 ug/L

Evaluation of the results of the 4 RO treated water samples taken from November 2007 to January 2008 revealed that radiological contamination was detected in all 4 samples; gross alpha samples ranged from 16 pCi/L – 27 pCi/L with an average activity of 20 pCi/L. Uranium ranged from 30ug/L – 40 ug/L with an average activity of 33.75 ug/L.

Evaluation of the results of the 25 RO treated water samples taken from September 2011 to April 2014 revealed that radiological contamination was detected in all 25 samples. Gross alpha samples ranged from 0.18 pCi/L – 32 pCi/L with an average activity of 8.1 pCi/L in 2011, 11.3 pCi/L in 2012, 24.32 pCi/L in 2013, and 31.7 pCi/L in 2014. Uranium ranged from 2 ug/L – 32.4 ug/L with an average activity of 11.33 ug/L in 2011, 13.9 ug/L in 2012, 23.83 ug/L in 2013, and 29.55 ug/L in 2014.

No other chemical or radiological analytes in the RO treated water exceeded the recommended exposure guidelines.

Risk Summary: No acute or chronic health risks associated with incidental ingestion of RO treated water were identified at the TCM, Bishkek-Manas. Radiological exposure guidelines are based on consumption of at least 2 L of water per day over 70 years. Estimated consumption of RO treated water is less than 1 L per day. The possibility that deployed personnel consumed significant quantities of RO treated water over a long period of time is remote.

Medical Implications: No medical implications are expected from consuming water at the concentrations detected at the TCM, Bishkek-Manas.

Confidence in the Risk Assessment: Confidence in the risk assessment is medium. Complete chemical analysis of 18 reverse osmosis water samples was taken over 10 years. There was also an active and ongoing drinking water surveillance program at the TCM, Bishkek-Manas which further increases confidence in this assessment.

4.3.2.2 Disinfected Fresh Water (used for personal hygiene).

Exposure Guidelines (Military LTP Standards/MCL):

Gross alpha particle activity: 15 pCi/L

Uranium: 30 ug/L

Evaluation of the results of 2 disinfected water samples (referred to as source water in documentation) taken from December 2013 to April 2014 revealed that radiological contamination was detected in both samples; gross alpha samples ranged from 23.2 pCi/L – 24.2 pCi/L with an average activity of 23.7 pCi/L, exceeding the MCL. Uranium ranged from 28.06 ug/L – 29.4 ug/L with an average activity of 28.73 ug/L, below the MCL.

Evaluation of the 2 samples of disinfected fresh water did not reveal any other exceedances of USAPHC TG 230 health risk screening criteria.

On 27 and 28 April 2013 the Pizza Hut sampling location tested positive for the presence of total coliform. Further analysis of the samples positively identified *Klebsiella pneumoniae* and *Citrobacter freundii* bacteria. Both bacteria are considered a low risk to healthy individuals.

Between January and March 2014, multiple samples from Ops Town buildings (3035, 3036, 4015, 4250 and the Ops Town DFAC) tested positive for the presence of total coliform, some of which further tested positive for the presence of E. coli. Water lines within buildings 3035, 3036, 4015, and 4250 were flushed until the contamination was cleared. The DFAC was switched to bottled water for all cooking and food preparation operations until their final closure. No illnesses were identified during this period and the risk was considered low in healthy individuals due to exposure avoidance measures.

Risk Summary: Low acute or chronic health risks associated with incidental ingestion of disinfected fresh water during showering were identified at the TCM, Bishkek-Manas.

Medical Implications: No medical implications are expected from consuming water at the concentrations detected at the TCM, Bishkek-Manas.

Confidence in the Assessment: Even though there are relatively few samples in the data set, confidence in this risk assessment is high based on the limited potential for ingestion of host nation treated water.

[Return to Table 2](#)

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons

There were no specific hazard sources or exposure incidents documented in the Defense Occupational and Environmental Health Readiness System (DOEHRs) or the Military Exposure Surveillance Library (MESL) during the period December 2002 to June 2014 time frame.

5.1.1 Short and long-term health risks:

Not Evaluated - No data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Risk Summary: None; no data were available upon which to base a risk assessment specific to TCM (Bishkek-Manas).

Medical Implications: None; no data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Confidence in the Risk Assessment: None; no data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

5.2 Depleted Uranium (DU)

There were no specific hazard sources or exposure incidents documented in DOEHRs or the MESL during the period from December 2002 through June 2014 time frame.

5.2.1 Short and long-term health risks:

Not Evaluated - No data were available specific to the TCM (Bishkek-Manas).

Risk Summary: None; no data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Medical Implications: None; no data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Confidence in the Risk Assessment: None; no data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

5.3 Ionizing Radiation

Specific hazard sources were documented in DOEHS or the MESL from the December 2002 through June 2014 time frame at the TCM (Bishkek-Manas). The 376 Expeditionary Medical Group utilized two portable x-ray units for medical radiography. The radiology technician was typically the only individual enrolled in the thermoluminescent dosimetry (TLD) program, with no over exposures recorded. The 376 ECEs Explosive Ordnance Disposal flight had one portable x-ray unit integrated into an explosives robot. 376 Expeditionary Security Forces Squadron personnel operated x-ray backscatter units to inspect vehicles entering the installation. Security Forces and U.S. Army personnel operated x-ray body scanners and bag scanners at the main entry control point. U.S. Army personnel operated x-ray body and bag scanners at the U.S. Customs facility.

5.3.1 Short and long-term health risks:

Risk Summary: Low based on available data specific to the TCM (Bishkek-Manas).

Medical Implications: No medical implications are expected.

Confidence in the Risk Assessment: High; no available data exceeded exposure limits specific to the TCM, Bishkek-Manas.

5.4 Non-Ionizing Radiation

Lasers: Aircraft were equipped with lasers. Specific health hazards associated with each laser system were documented in DOEHS. Administrative procedures were in place to reduce/prevent laser incidents.

Radiofrequency Radiation (RFR): 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 RFR systems were aware to notify Bioenvironmental Engineering for any suspected or potential exposure to RFR for documentation and investigation.

5.4.1 Short and long-term health risks:

Not Evaluated. - No data were available specific to the TCM (Bishkek-Manas).

Risk Summary: None - no data were available/insufficient data exists upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Medical Implications: None - No data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

Confidence in the Risk Assessment: None - No data were available upon which to base a risk assessment specific to the TCM (Bishkek-Manas).

[Return to Table 2](#)

6 Endemic Diseases

6.1 Sample data/notes:

The assessed risk for endemic diseases addressed below represents the residual risk that exists in the presence of preventive measures.

Department of Defense Directive 6490.02 series, Comprehensive Health Surveillance, establishes policy for routine health surveillance of all DoD personnel throughout their military service.

The Armed Forces Health Surveillance Branch (AFHSB) maintains archives of medical event reports for all Services.

Medical event reports identified related to deployment in Kyrgyzstan did not identify specific locations within the country, nor did they describe the probable site of the exposure; therefore, epidemiological analysis of medical event data was limited to the country level.

Endemic diseases present in Kyrgyzstan were assessed by referring to the World Health Organization's Kyrgyzstan Communicable Disease Profile and the "Destinations" section of the Centers for Disease Control and Prevention (CDC) Travelers' Health website, <http://wwwnc.cdc.gov/travel/destinations/traveler/none/Kyrgyzstan>.

Where effective vaccines, such as those for Hepatitis A and B, are in place, risk to individuals is effectively reduced to none and these endemic diseases were excluded from further assessment.

Reporting of medical events from deployed environments is inconsistent. Identified reports of endemic disease associated with deployment to Kyrgyzstan are assumed not to represent all cases of reportable endemic disease events among service personnel deployed to Kyrgyzstan. Where available, additional relevant reports were used to supplement reportable medical event data for this assessment.

6.2 Gastrointestinal Diseases

U.S. Service members have little or no immunity to the food and waterborne diseases present in Kyrgyzstan. 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. To prevent food and waterborne diseases among individuals deployed to Kyrgyzstan, food and water was purchased from approved sources. Food was prepared in facilities where there was public health oversight (certificate of sanitation, health screening of food service workers, periodic inspections, etc.). Due to the potential presence of disease causing organisms, as well as the high prevalence of improper food handling and preparation, local food and water were not approved for consumption. Deployed personnel were authorized to travel off base and would frequent local restaurants and grocery stores. Viral gastroenteritis that is spread through contact or fomites (any inanimate object or substance capable of carrying infectious organisms) presents a recurrent risk due to a high rate of personnel turnover, and shared dining, berthing, bathroom facilities, and working spaces.

Approach: The health risk for fomite-borne gastrointestinal infections and endemic food and waterborne diseases to individuals deployed to Kyrgyzstan during the period of this assessment was epidemiologically assessed based on the combination of identified endemic diseases, knowledge of preventive measures in place, review of medical event reports associated with deployment to Kyrgyzstan, and review of military public health reports.

6.2.1 Short -term health risks:

Risk assessment:

The short-term risk for viral gastroenteritis was low. Risk due to a high rate of personnel turnover, shared dining, berthing, bathroom facilities, and working spaces is not substantially different than that expected in similar settings within the United States.

The short-term risk associated with food borne and waterborne diseases in Kyrgyzstan at the TCM, Bishkek-Manas was low; the risk for those consuming local food, water or ice from off base locations was moderate to high (bacterial or viral gastroenteritis, protozoal diarrhea, cholera, brucellosis, hepatitis E).

Medical implications: Gastroenteritis, particularly from viral agents, can cause periodic outbreaks in spite of preventive measures. A small number of infections may require greater than 72 hours convalescence and/or hospitalization.

Confidence in the risk assessment: Confidence in the risk assessment is high. Food and water borne diseases, especially those with short convalescence and lack of long-term health effects are often underreported for deployed military populations.

6.2.2 Long-term (chronic) health risks:

Risk assessment: The long-term risk associated with food and waterborne diseases was at the TCM, Bishkek-Manas was low for protozoal diarrhea and brucellosis. The long-term risk for those consuming local food and drinks from off base locations was moderate for protozoal diarrhea and brucellosis.

Medical implications: Long-term health effects resulting from infection with food and waterborne diseases are rare.

Confidence in the risk assessment: Confidence in the risk assessment was high. Incidence of protozoal diarrhea and brucellosis in the post deployment military population is known to be extremely low.

[Return to Table 2](#)

6.3 Arthropod Vector-Borne Diseases

The climate and ecological habitat found in Kyrgyzstan support populations of arthropod vectors, including mosquitoes, ticks, and sand flies. Risk for arthropod-borne disease is higher during warmer months (typically from April through November); with variable rates of disease transmission (vector-borne diseases occur at low or unknown levels throughout the country). Personnel may have been exposed to mosquitoes, ticks, sand flies, or other biting vectors both during the day or night. Risk is higher in urban and other densely populated areas, or near where animals were kept. Removing vector harborages, spraying for vectors within base camps, avoiding animals or areas where they were kept, proper wearing of insecticide-treated (permethrin) uniforms, use of bed nets in field conditions, and the application of insect repellent to the skin (DEET) were the main protective measures against vector-borne diseases. Of the endemic vector-borne diseases present in Kyrgyzstan, malaria is the only disease for which chemoprophylaxis is available.

Approach: The health risk for endemic vector-borne diseases to individuals deployed to Kyrgyzstan during the period of this assessment was epidemiologically assessed based on the combination of identified endemic diseases, knowledge of preventive measures in place, review of medical event reports associated with deployment to Kyrgyzstan, and review of military public health reports. Because the Kyrgyz Republic lacks adequate diagnostic capability, vector-borne diseases are frequently underreported, and there is a reliance on clinical (symptom-based vs. laboratory confirmation based) diagnosis.

6.3.1 Short-term (acute) health risks:

Risk assessment:

The short-term risk for the vector-borne diseases sand-fly fever, West Nile fever, typhus and plague was low. The short-term risk for the vector-borne disease Crimean-Congo hemorrhagic fever was moderate when unmitigated

but reduced to low with appropriate mitigation measures. Individuals who deploy from the TCM, Bishkek-Manas, and/or supported base camps, to urban or rural outlying areas may experience increased short-term risk.

The short-term risk for malaria was moderate when unmitigated but reduced to low with appropriate mitigation measures. The short-term risk for cutaneous leishmaniasis was low. Individuals who deployed from the TCM, Bishkek-Manas or the other camps in the immediate vicinity, to urban or rural outlying areas, may have experienced increased short-term risk.

Medical implications:

Malaria, sand-fly fever, West Nile Fever, Crimean-Congo hemorrhagic fever, typhus, and plague present in Kyrgyzstan have fairly short incubation periods ranging from days to weeks. Any of these diseases would initially present as acute fever and malaise, some accompanied by rash, and would lead to acute, sometimes severe illness.

Cutaneous leishmaniasis typically presents as skin lesions, single or multiple, that start as a papule and enlarge into an ulcer.

Confidence in the risk assessment: Confidence in the risk assessment is medium. Reports of vector borne disease, including malaria and leishmaniasis, were received through official DoD medical event reporting systems.

6.3.2 Long-term (chronic) health risks:

Risk assessment:

The long-term risk for leishmaniasis, cutaneous and visceral, was low.

The long-term risk for *vivax* (relapsing) malaria was moderate when unmitigated but reduced to low with appropriate mitigation measures.

Medical implications: Both visceral and cutaneous leishmaniasis may have extended incubation periods, ranging from a months to years. Although rare, it is possible to be infected during deployment, but not to have clinically evident disease until redeployed. Leishmaniasis should be considered in the differential diagnosis for any unusual skin lesions, or chronic, systemic disease. *Plasmodium vivax*, *P. falciparum* malaria, and *P. malaria* were the predominate species of malaria found in Kyrgyzstan. Relapses following *vivax* blood stage treatment are possible due to hypnozoites that remain dormant in the liver.

Confidence in the risk assessment: Confidence in risk assessment is medium. Incidence of visceral leishmaniasis in the post deployment military population is known to be low. Cases of cutaneous leishmaniasis were detected and treated post deployment. The military medical community was/is aware of the presence of leishmaniasis in Kyrgyzstan, and skin lesions in individuals with a history of time spent in Kyrgyzstan were/are evaluated with that in mind. No cases of relapsing malaria have been reported in the Service-mandated reporting systems.

[Return to Table 2](#)

6.4 Water Contact Diseases

Operations or activities that involve extensive fresh water contact may result in individuals being exposed to leptospirosis. The occurrence of flooding after heavy rainfall facilitates the spread of leptospirosis because, as water saturates the environment, leptospirosis present in the soil pass directly into surface waters. Activities such as wading or swimming in fresh water sources may result in exposures to enteric diseases such as diarrhea and hepatitis via incidental ingestion of water. Prolonged water contact also may lead to the development of a variety

of skin conditions, such as bacterial or fungal dermatitis. Elimination of standing, and/or open, bodies of fresh water protects against the spread of water contact diseases.

Approach: The health risk for endemic water contact diseases to individuals deployed to Kyrgyzstan during the period of this assessment was epidemiologically assessed based on the combination of identified endemic diseases, knowledge of preventive measures in place, review of medical event reports associated with deployment to Kyrgyzstan, and review of military public health reports.

6.4.1 Short-term (acute) health risks:

Risk assessment: The short-term risk for leptospirosis was moderate when unmitigated but reduced to low with appropriate mitigation measures. Personnel were not typically exposed to untreated, open water. Personnel were authorized to travel off base and were allowed to participate in fishing and white-water rafting tours in untreated open water.

Medical implications: Leptospirosis, which has an incubation period of 5-14 days, presents as acute fever with nonspecific symptoms that last for 1 week to several months.

Confidence in the risk assessment: Confidence in the risk assessment is medium. No reported cases of water contact diseases were identified from Kyrgyzstan during the assessment period.

6.4.2 Long-term (chronic) health risks: No long-term health risks were identified.

[Return to Table 2](#)

6.5 Respiratory Diseases

U.S. military populations living and working in close-quarter conditions were at risk for substantial person-to-person spread of respiratory virus infections such as the common cold and influenza. Primary exposure pathways for tuberculosis include prolonged close contact (generally several hours per day for greater than three days per week in a closed space) with the local population or third country national contractors. U.S. personnel who remained on base had limited to no contact with the local population, and local and third country national workers/contractors were required to complete health screening prior to employment.

Approach: The health risk for respiratory diseases to individuals deployed to Kyrgyzstan during the period of this assessment was epidemiologically assessed based on the combination of identified endemic diseases, knowledge of preventive measures in place, review of medical event reports associated with deployment to Kyrgyzstan, and review of military public health reports.

6.5.1 Short-term (acute) health risks:

Risk assessment:

The short-term risk for upper respiratory infections was moderate. Risk due to a high rate of personnel turnover, shared dining, berthing, recreational facilities, and working spaces is not substantially different than that expected in similar settings within the United States.

The short-term risk for tuberculosis was moderate.

Medical implications:

Upper respiratory infections, particularly from viral agents, can cause periodic outbreaks in spite of preventive measures. A small proportion of infections may require greater than 72 hours convalescence and/or hospitalization.

Symptoms of tuberculosis, including fever, weight loss, night sweats and cough, typically start within 1-6 months of infection. The lifetime risk for tuberculosis after becoming infected is 5-10%; half of this risk occurs in the first two years following infection.

Confidence in the risk assessment: Confidence in risk assessment is medium. Upper respiratory infections, especially those with short convalescence and lack of long-term health effects are not reportable for deployed military populations. Tuberculosis prevalence in the local population is widespread, but no reports of tuberculosis were identified for individuals deployed to Kyrgyzstan during the assessment period.

6.5.2 Long-term (chronic) health risks:

Risk assessment: The long-term risk for tuberculosis was low.

Medical implications: Symptoms of tuberculosis can be delayed by two or more years following infection. Tuberculosis should be considered in assessing symptoms of fever accompanied by night sweats and cough.

Confidence in the risk assessment: Confidence in risk assessment is medium. Prevalence of tuberculosis in the local population is widespread, but prevalence of tuberculosis in the post deployment military population is known to be extremely low.

[Return to Table 2](#)

6.6 Animal-Contact Diseases

Animals in Kyrgyzstan were not routinely vaccinated against vaccine preventable diseases such as rabies or anthrax. Q-fever, anthrax, and rabies are known to be present in Kyrgyzstan. Exposure to animals, and/or locations where animals were kept (stray dogs/cats, barnyards, slaughterhouses), were the primary infection sources for all these diseases, and avoidance of companion and farm animal contacts was the primary prevention strategy. Preventive measures in place include anthrax vaccination, which is effective in preventing both cutaneous and inhalation anthrax, and rabies post exposure prophylaxis, which is effective for preventing onset of rabies in exposed individuals.

Approach: The health risk for endemic animal contact diseases to individuals deployed to Kyrgyzstan during the period of this assessment was epidemiologically assessed based on the combination of identified endemic diseases, knowledge of preventive measures in place, review of medical event reports associated with deployment to Kyrgyzstan, and review of military public health reports.

6.6.1 Short-term (acute) health risks:

Risk assessment: The short-term risk for anthrax (naturally acquired) low. The short-term risk for rabies and Q-fever was moderate.

Medical implications: Naturally occurring anthrax (non-weaponized) is an acute disease that usually affects the skin, while inhalation anthrax has mild and non-specific initial symptoms among unimmunized individuals.

Symptoms of acute Q-fever, which may present one week to greater than one month after exposure, include fever, chills and weakness.

Rabies presents as an acute, viral encephalomyelitis and is almost invariably fatal.

Confidence in the risk assessment: Confidence in risk assessment is high.

6.6.2 Long-term (chronic) health risks:

Risk assessment: The long-term risk for Q-fever and rabies was low. However, Q-fever was diagnosed in a small number of personnel after they returned to the U.S.

Medical implications: Q-fever is generally an acute febrile disease. However, considerable variation in severity and duration may be seen; infections may be unapparent or present as a nonspecific undifferentiated febrile syndrome or as pneumonia. Q-fever should be considered in the differential diagnosis of an undifferentiated febrile syndrome when personnel mention a history of being near or in areas where animals were kept or had been kept.

The incubation period for rabies is typically 1–3 months, but may be more than one year in rare instances.

Confidence in the risk assessment: Confidence in risk assessment is high.

[Return to Table 2](#)

7 Venomous Animals/Insects

The species listed below have home ranges that overlap the country of Kyrgyzstan, and may present a health risk if encountered. Information was taken from US Army Public Health Command, Armed Forces Pest Management Board Living Hazards Database, and personal communication from previously deployed preventive medicine personnel. Little to no regional (within the country of Kyrgyzstan) animal range information was available. The below list should not be considered all inclusive; other venomous scorpions and snakes may be present in the region. See Section 10 for more information about pesticides and pest control measures.

7.1 Short-term (acute) health risk:

7.1.1 Spiders: Numerous species of spiders are found in Kyrgyzstan. The Widow Spider (*Latrodectus dahlia*) is the only known species whose bite presents a threat. Widow spider bites are mostly minor and even significant envenomation is unlikely to be lethal. Bite is usually felt as a "sting", with delayed (10+min) local pain, and sweating. More severe envenomation may produce regional pain, tender draining lymph nodes, nausea, hypertension, and malaise. Health risk was low to high.

7.1.2 Scorpions: Several species of scorpion are found in Kyrgyzstan. The majority of scorpions found in the region have stings that cause only short lived local effects, such as pain, without systemic effects. Serious envenomation may result in numbness, frothing at mouth, difficulty breathing, and convulsions. Various factors influence the severity of the envenomation to include health and age of patient, sting site, and size and age of scorpion. Most scorpion venom is neurotoxic with a mixture of other substances. If the patient is allergic to bee and wasp stings, extreme caution and care must be taken to prevent excessive morbidity and even possibly death. The following Buthidae family scorpions are listed as present in Kyrgyzstan and have known detrimental health effects:

- *Mesobuthus eupeus*.
- *Mesobuthus caucasicus* (unknown health effects).

Overall health risk from scorpions was low.

7.1.3 Snakes: Numerous species of snakes are found in Kyrgyzstan. A number of poisonous snakes, whose range incorporates Kyrgyzstan, could have been encountered to include cobras, pit vipers, and vipers. Vipers were the most significant types of snakes that posed a health risk if encountered. The following list is not an all-inclusive list of snakes in the area, but rather those deemed most significant or potentially encountered.

- *Gloydius halys* (Haly's Pit Viper): Bites are typically moderate to severe, with potentially lethal envenoming, requiring urgent assessment and treatment, including IV fluids, IV anti-venom and good wound care. Bites

may cause moderate to severe coagulopathy and hemorrhagic activity.

- *Gloydius intermedius* (Central Asian Pit Viper): Bites are typically moderate to severe, with potentially lethal envenoming, requiring urgent assessment and treatment, including IV fluids, IV anti-venom and good wound care. Bites may cause moderate to severe coagulopathy and hemorrhaging causing extensive bleeding.
- *Vipera renardi* (Tien Shan Mountain Meadow Viper): Bites are typically moderate to severe, with potentially lethal envenoming, requiring urgent assessment and treatment, including IV fluids, IV anti-venom and good wound care. Bites may cause mild to severe local effects, shock and coagulopathy.
- *Naja oxiana* (Central Asian Cobra): Bites are typically moderate to severe, with potentially lethal envenoming, requiring urgent assessment and treatment, including IV fluids, IV anti-venom and good wound care. Bites can cause systemic effects, principally flaccid paralysis.

Overall, the health risk associated with snakes was **low**.

7.2 Long-term (chronic) health risk:

No long-term health risks were identified based on available data.

Risk assessment: The long-term risk associated with snakes was low to high.

Medical implications: Long-term health effects resulting from interaction with snakes is Low Based on efficacy of control measure as evidenced by lack of disease(s) reported in various medical surveillance data bases e.g, TMDS, MERS, DRSi as per incident reporting from Kyrgyzstan.

Confidence in the risk assessment: Confidence in risk assessment is low.

[Return to Table 2](#)

8 Heat/Cold Stress

8.1 Site-Specific Conditions:

The TCM, Bishkek-Manas is characterized by a continental climate with warm to hot summers, cold winters and moderate temperatures throughout the remainder of the year. The region generally experiences minimal precipitation year-round to exclude heavy snowfalls during the winter. Summer is typically warm, clear and dry with temperatures averaging between 77°F and 91°F but peak temperatures can exceed 100°F. Winters in the region are typically cold and harsh with average temperatures below freezing but may drop as low as -25°F. During the winter months, it is not atypical to have temperature changes of 40 °F after sunset with temperatures often below freezing. The risk of cold stress/injury increases with colder temperatures, wind, longer exposures, inactivity and inadequate clothing. The snowfall varies with an average accumulation of 6-8 inches per month. Prevailing winds come from the southeast most of the year (May through January) at an average of 6 to 8 knots. Prevailing winds are out of the west the remainder of the year (February through April). Calm conditions occur often, especially in December and January, but downslope winds occur often at night as well. Foehn winds, locally called harmsils, occur all year and can become fairly strong with peak gusts averaging from 29 to 49 knots.

8.2 Heat

8.2.1 Heat Exposure Guidelines

The risk of heat injury is based on the Wet Bulb Globe Temperature Index as follows:

Low (80-84.9 °F)

Moderate (85-87.9°F)

High (88-89.9°F)

Extremely High (≥ 90°F)

8.2.2 Short (acute) and long-term (chronic) health risk:

Approach: No heat casualty, medical event reports involving heat injuries or heat stress monitoring data were available in the Defense Occupational and Environmental Health Readiness System or the Military Exposure Surveillance Library for any of the camps covered in this assessment. Accordingly, risk estimates are based strictly on existing climatologic data.

Risk Summary:

Short-term (acute) health risk: The short-term health risk of heat injury for unacclimatized individuals (i.e. on site less than four weeks) from June-September was moderate. For the remainder of the year, health risk was low. Health risk for persons with underlying health conditions may be elevated above these baselines, especially during June-September.

Long-term health risk: The long-term health risk was low.

Medical implications: Severity of heat injury can range from mild clinical signs such as clamminess, nausea, disorientation or headache to life threatening symptoms requiring hospitalization. Long-term medical implications from heat injuries are rare but can occur, especially from more serious injuries such as heat stroke. Individuals with a history of heat injury, even when medical attention was not sought, are at increased risk for future heat injury; repeat heat injury may have increased severity.

Confidence in the risk assessment: Based on generally available information on climatic conditions and the absence of reported heat injuries, confidence in risk assessment is medium. Individuals who experienced mild symptoms of heat injury may not have sought medical attention; this may lead to an underestimation of the risk.

[Return to Table 2](#)

8.3 Cold

8.3.1 Short (acute) and long-term (chronic) health risks:

Approach: No cold injury data were available in the Defense Occupational and Environmental Health Readiness System or the Military Exposure Surveillance Library for any of the camps covered in this assessment. Accordingly, risk estimates are based strictly on existing climatologic data.

Risk Summary: The risk for cold stress/injuries is largely dependent on clothing/equipment worn, operational work intensity and individual factors rather than environmental factors alone. The acute and chronic risk for non-freezing cold injuries, such as chilblain, frostbite, trench foot, and hypothermia was moderate.

Medical implications: The cooling of body parts may result in various cold injuries - nonfreezing injuries, freezing injuries and hypothermia which is the most serious. Toes, fingers, ears and nose are at greatest risk because these areas do not have major muscles to produce heat. In addition, the body will preserve heat by favoring the internal organs and thus reducing the flow of blood to the extremities under cold conditions. The most severe cold injury is hypothermia, which occurs from excessive loss of body heat and the consequent lowering of the body's core temperature.

Confidence in the risk assessment: Based on generally available information on climatic conditions and the absence of reported cold injuries, confidence in risk assessment is medium. Individuals who experienced mild symptoms of cold injury may not have sought medical attention; this may lead to an underestimation of the risk.

[Return to Table 2](#)

9.1 Continuous

9.1.1 Exposure Guidelines:

The Services have established occupational exposure limits (OEL) for continuous or intermittent noise at 85 decibels on the A-weighted scale (dB(A)), 84 dB(A) for the Navy, as an eight hour time-weighted average (TWA). The A-weighted scale of noise measurement is used because it mimics the human ear's response to sound. All Services require that individuals routinely exposed to noise levels greater than the OEL be enrolled in the hearing conservation program. Generally, routinely exposed is defined as when the TWA exceeds 84 dB(A) on average more than 2 days in any month.

9.1.2 Site Specific Conditions:

Sources of potential noise include flight line operations, associated with both fixed and rotary wing aircraft, tactical generators and various hand tools in industrial and maintenance shops. Due to the inherent noise hazard in flight line operations, personnel were required to wear dual hearing protection.

9.1.3 Short (acute) and long-term (chronic) health risk:

Approach: Knowledge of the Service hearing conservation programs and typical sound pressure level measurements associated with the various potential noise generating sources were used to complete the health risk assessment.

Risk Summary:

Short-term health risk: The short-term risk of noise induced hearing loss with the use of appropriate hearing protection use was low. Few exposed individuals are expected to have experienced noticeable short-term health effects such as annoyance, speech interference, fatigue and temporary hearing threshold shifts during deployment.

Long-term health risk: The long-term risk of noise induced hearing loss with appropriate hearing protection use is low to moderate.

Confidence in the Risk Assessment: Confidence in the health risk assessment is medium. There is a well-established hearing conservation program; hearing protection is readily available and generally worn by individuals with known occupational exposures across the Services. However, the limited availability of information about specific noise sources and enforcement of the use of personal protective equipment diminishes confidence.

9.2 Impulse

No information about potential sources of impulse noise (140 dB(A) or greater) was available.

9.2.1 Short-term (acute) and Long-term (chronic) health risks:

Not evaluated: Insufficient data exist upon which to base a health risk assessment.

[Return to Table 2](#)

10 Unique Concerns

10.1 Special Incidents:

Open air burning was used consistently by the civilian population in the immediate areas surrounding the TCM, Bishkek-Manas for refuse disposal during the period covered by this POEMS. The estimated volume of waste disposed of through burning per day is unknown. Smoke plumes from refuse burning periodically impacted sectors of the TCM, Bishkek-Manas, depending on the prevailing winds. Freezing temperatures prevented the collection of air sampling data.

A class III TS-1 jet fuel spill occurred on 1 December 2013 in the 376 Expeditionary Logistics Readiness Squadron fuels distribution area (POL fuel yard near building 7060). An estimated release of 80-100 gallons of TS-1 jet fuel was released, of which an estimated 70-80 gallons was recovered. The spill was mitigated within 24 hours of release.

Not evaluated: Air quality data was unable to be collected during the fires for which could serve as a basis for a health risk assessment. Air quality data was unable to be collected during the December 2013 fuel spill and mitigation.

Risk Summary: None, insufficient data exists upon which to base a risk assessment specific to the TCM, Bishkek-Manas.

Medical Implications: No data were available upon which to base a risk assessment specific to the TCM, Bishkek-Manas.

Confidence in the Risk Assessment: Low - No data were available upon which to base a risk assessment specific to the TCM, Bishkek-Manas.

[Return to Table 2](#)

10.2 Potential Environmental Contamination Sources

In addition to environmental exposures already discussed, there may be specific occupational exposure pathways associated with aircraft, vehicle and site maintenance. Typical chemicals of concern associated with potential occupational exposures were petroleum, oils, and lubricants. No industrial hygiene data exist to document the significance of occupational exposures; however, there were typically procedures in place for storage, handling, use and disposal of hazardous materials which generally minimize health risk.

Regulated hazardous medical waste (red-bagged) was collected and incinerated on site. The medical incinerator was operated and maintained by contractors. Solid waste was primarily disposed of through host nation contractor. Storage and disposal of industrial waste generated on base was coordinated at the unit level with long-term storage conducted at the hazardous material/waste storage site on the TCM, Bishkek-Manas. No obvious signs of major spills or tank leakage were noted at the hazardous material/waste storage site. Chemical latrines were pumped out by trucks and the waste was disposed of off base.

Approach: Knowledge of the U.S. Central Command and Service specific policies and procedures served as the basis of this risk assessment.

10.2.1 Short-term (acute) and Long-term (chronic) health risks: Low.

Risk Summary: Low, insufficient data exists upon which to base a full risk assessment specific to the TCM, Bishkek-Manas.

Medical Implications: None - No data were available upon which to base a risk assessment specific to the TCM, Bishkek-Manas.

Confidence in the risk assessment: Confidence in the risk assessment is high. Typical chemicals of concern associated with potential occupational exposures are petroleum, oils, and lubricants. These were generally present

in relatively low volumes. Procedures for storage, handling, use and disposal of hazardous materials were in place throughout the theater of operations to minimize health risk.

10.3 Pesticides/Pest Control:

Contracted vector control personnel mitigated pests and vectors in accordance with mandated integrated pest management practices. The overwhelming majority of those efforts at the TCM, Bishkek-Manas were in the reduction of filth flies, rodents, and feral animals. Non-chemical measures such as exclusion measures and sanitation were first and primary efforts. Secondary measures included the use of targeted bait applications for flies and rodents, and various animal trapping methods. Tertiary measures included the application of pesticides which contained active ingredients that degraded rapidly in the Kyrgyzstan environment. Pesticide use was minimal and limited to traps and sprays for common pests. There were no grounds requirements for the use of herbicides/pesticides. On-site or regional oversight was provided as available to ensure compliance with Theater, Navy, and DoD practices and regulations.

10.3.1 Short and Long-term (chronic) health risk

Approach: The Contingency Pest Management Guide was reviewed for compliance with DoDI 4150.07 requirements. In addition, U. S. military entomologists who served at the Navy Entomology Center of Excellence were consulted about their knowledge of pest management activities at these camps.

Risk Summary: Low based on available data.

Short-term health risk: No short-term health risk was identified based on available data.

Long-term health risk: No long-term health risk was identified based on available data.

Confidence in the risk assessment: Confidence in the risk assessment is high. The integrated pest management plan emphasizes non-chemical control over the use of chemical pesticides. The potential for camp residents to come in contact with improperly formulated insecticides is remote.

[Return to Table 2](#)

10.4 Asbestos and Lead-Based Paint

10.4.1 Site-Specific Conditions:

Most structures occupied by U.S. personnel during the period were erected as new and therefore, there was no issue of exposure to potential sources of asbestos containing material (ACM) or peeling paint that could contain lead. Some U.S. personnel worked in pre-existing structures located on the TCM, Bishkek-Manas.

Asbestos containing building debris was found on the west end of the base in the park behind the Civil Engineering complex. The materials were intact and not considered friable. Sample results from 2002 confirmed that the material contained asbestos. Large varieties of debris existed on many areas of the TCM, Bishkek-Manas and it is likely that some of the material contained asbestos. Additionally, samples from other building materials throughout the base have tested positive for asbestos. Building and demolition work was contracted out to local contractors with military oversight, military did not perform any the work or perform clean up actions. .

10.4.2 Short-term (acute) health risk:

Risk Summary: Low, based on available data and as long as the materials remain intact and non-friable.

Medical Implications: None - No data were available upon which to base a risk assessment specific to the TCM, Bishkek-Manas.

Confidence in the Risk Assessment: None based on available data.

10.4.3 Long-term (chronic) health risk:

Not evaluated: No data exist upon which to base a health risk assessment.

Risk Summary: Low, based on available data and as long as the materials remain intact and non-friable.

Medical Implications: None based on available data.

Confidence in the Risk Assessment: High.

10.5 Burn Pit

While not specific to the TCM, Bishkek-Manas, the consolidated epidemiological and environmental sampling and studies on burn pits that have been conducted as of the date of this publication have been unable to determine whether an association does or does not exist between exposures to emissions from the burn pits and long-term health effects (Reference 7).

The committee's review of the literature and the data suggests that service in Iraq or Afghanistan (i.e., a broader consideration of air pollution than exposure only to burn pit emissions) may be associated with long-term health effects, particularly in susceptible (e.g., those who have asthma) or highly exposed subpopulations, such as those who worked at the burn pit.

Such health effects would be due mainly to high ambient concentrations of PM from both natural and anthropogenic sources, including military sources. If that broader exposure to air pollution turns out to be relevant, potentially related health effects of concern are respiratory and cardiovascular effects and cancer.

Susceptibility to the PM health effects could be exacerbated by other exposures, such as stress, smoking, local climatic conditions, and co-exposures to other chemicals that affect the same biologic or chemical processes.

Individually, the chemicals measured at burn pit sites in the study were generally below concentrations of health concern for general populations in the United States. However, the possibility of exposure to mixtures of the chemicals raises the potential for health outcomes associated with cumulative exposure to combinations of the constituents of burn pit emissions and emissions from other sources.

10.5.1 Particulate matter, less than 10 micrometers (PM₁₀)

10.5.2 Exposure Guidelines:

Short Term (24-hour) PM₁₀ (µg/m³):

- Negligible MEG = 250
- Marginal MEG = 420
- Critical MEG = 600

Long-term PM₁₀ MEG (µg/m³):

- Not defined and not available.

10.5.2.1 Sample data/Notes:

A total of 14 valid PM₁₀ air samples were collected from 2002 – 2004. The range of 24-hour PM₁₀ concentrations was 14 µg/m³ – 160 µg/m³ with an average concentration of 46 µg/m³.

A total of 36 valid PM₁₀ air samples were collected from April to May 2014. The range of 24-hour PM₁₀ concentrations was 32.4 µg/m³ – 172.5 µg/m³ with an average concentration of 65.6 µg/m³.

Air sampling could not be accomplished from November – March due to equipment limitations associated with cold temperatures.

10.5.2.2 Short-term health risks:

Risk Summary: Low, based on average and peak PM₁₀ concentrations, and the likelihood of exposure at these hazard severity levels. A low health risk assessment for typical and peak exposure concentrations suggests that short-term exposure to PM₁₀ at the TCM, Bishkek-Manas was expected to have little to no impact on accomplishing the mission (USAPHC TG 230, Table 3-2). Confidence in the short-term PM₁₀ health risk assessment was low based on the limited PM₁₀ air sampling data available and inconsistency of sampling (USAPHC TG 230, Table 3-6).

The hazard severity was negligible for average PM₁₀ exposures. The results indicate that few personnel 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 with minimal to no degradation of abilities to conduct complex tasks are expected (USAPHC TG 230, Table 3-4).

For the highest observed PM₁₀ exposure, the hazard severity was negligible. During peak exposures at the negligible hazard severity level, exposed personnel are expected to be able to effectively perform all critical tasks during mission operations with minimal to no degradation of abilities to conduct complex tasks are expected (USAPHC TG 230, Table 3-4).

10.5.2.3 Long-term health risk:

Not Evaluated-no available health guidelines. The EPA has retracted its long-term NAAQS for PM₁₀ due to an inability to clearly link chronic health effects with chronic PM₁₀ exposure levels.

11 References

POEMS developed according to:

1. DoDI 6490.03, *Deployment Health*, 2006.
2. JCSM (MCM) 0028-07, *Procedures for Deployment Health Surveillance*, 2007.
3. DoDI 6055.05, *Occupational and Environmental Health*, 2008.
4. Klaassen, C.D. *Casarett & Doull's Toxicology: the Basic Science of Exposures*, Chapter 2, Principles of Toxicology; Fifth Edition, McGraw Hill, New York.

Site description and baseline information obtained from:

5. Environmental Baseline Survey Update Kyrgyzstan, August, 2007

Sampling data were obtained from the:

6. Defense Occupational and Environmental Health Readiness System (referred to as the DOEHRS-EH database) at <https://doehrs-ih.csd.disa.mil/Doehrs/>. Some of the data may be classified or otherwise have some restricted distribution. See discussion below.
7. Military Exposure Surveillance Library: <https://mesl.apgea.army.mil/mesl/>. Some of the data and reports used may be classified or otherwise have some restricted distribution.

Additional environmental health reports/survey documents are from the:

8. Contingency Pest Management Guide, TG-24. Armed Forces Pest Management Board. February 2016. www.afpmb.org/sites/default/files/whatsnew/2015/TG24_Feb%202016_Provisional_Version.pdf
9. **Transit Center at Manas – Wikipedia** - https://en.wikipedia.org/wiki/Transit_Center_at_Manas

10. **Kyrgyzstan – Camp Bastion Profile – GlobalSecurity.Org -**
<http://www.globalsecurity.org/military/world/centralasia/manas.htm>
11. **Energy Sector Management Assistance Programme (ESMAP). Kazakhstan and Kyrgyzstan Opportunities for Renewable Energy Development, report number 16855 KAZ. November 1997.**
https://www.esmap.org/sites/esmap.org/files/Rpt_16855_kazakkyrgyz.pdf

Chemical hazards (air, water, soil) evaluated based on military exposure guidelines (MEGs) and risk assessment methodology in:

12. USACHPPM June 2010 Revision, Technical Guide (TG230), “Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel”. For further information, contact USAPHC Environmental Health Risk Assessment Program at: commercial 410-436-2953 or DSN 584-2953.
13. Department of the Army Technical Bulletin Medical (TB MED) 577, Sanitary Control and Surveillance of Field Water Supplies, TB Med 577, NAVMED P-5010-10, AFMAN 48-138, 1 May 2010.
14. USACHPPM, Particulate Matter Factsheet No. 64-009-0708, 2008.

Regional/country information on endemic/infectious disease and heat/cold from the:

15. Centers for Disease Control and Prevention (CDC) Travelers’ Health website
<http://wwwnc.cdc.gov/travel/destinations/traveler/none/kyrgyzstan>, “Destinations” section, Kyrgyzstan.
16. World Health Organization (WHO) World Malaria Report 2012, page 141.
17. “Cutaneous Leishmaniasis in U.S. Military Personnel – Southwest/Central Asia, 2002-2003.” Morbidity and Mortality Weekly Report (MMWR), October 24, 2003 / 52(42); 1009-1012.
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5242a1.htm>
18. Hartzell JD, Peng SW, Wood-Morris RN, Sarmiento DM, Collen JF, Robben PM, et al. Atypical Q fever in US soldiers. Emerg Infect Dis [serial on the Internet]. 2007 Aug. Available from
<http://wwwnc.cdc.gov/eid/article/13/8/07-0218.htm>

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 Deputy Assistant Secretary of Defense for Health Readiness Policy and Oversight (HRP&O).

Army Public Health Center (Provisional) 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.med.navy.mil/sites/nmcphc/Pages/Home.aspx>

U.S. Air Force School of Aerospace Medicine (USAFSAM) (formerly AFIOH) Phone: (888) 232-3764. <http://www.wpafb.af.mil/afri/711hpw/usafsam.asp>

DoD Health Readiness Policy and Oversight (HRP&O) Phone: (800) 497-6261.
<http://fhpr.dhhq.health.mil/home.aspx>