Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Al Udeid Air Base (AUAB), Qatar
Calendar Years: May 2004 to September 2012

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

PURPOSE: This POEMS documents the DoD assessment of base camp level Occupational and Environmental Health Surveillance (OEHS) exposure data for AUAB. It presents the identified health risks and assessments along with the possible associated medical implications. The findings were based on information collected from May 2004 through September 2012 to include deployment OEHS sampling and monitoring data (e.g. air, water, and soil), field investigation and health assessment reports, as well as country and area-specific information on endemic diseases. While this assessment may reflect similar exposures and health risks pertaining to historic or future conditions at this site, the underlying data were limited to the time period(s) and area(s) sampled and thus may not reflect fluctuations or unique occurrences. It also may not have been fully representative of all the fluctuations during the timeframe. To the extent that the data allowed, this summary describes the general ambient conditions at the site and characterizes the health risks at the population–level. While useful to inform providers and others of potential health effects and associated medical implications, it does not represent an individual exposure profile. Actual individual exposures and specific resulting health effects depend on many variables and, should be addressed in individual medical records by providers as appropriate at the time of an evaluation of a unique exposure.

SITE DESCRIPTION: Al Udeid AB (AUAB) is located approximately 30 km southwest of Doha, the capital of Qatar, and 25 km northwest of Messaieed (also referred to as Um Sa'id in some documents). The base is divided into 6 distinct main areas: Coalition Compound (CC), Blatchford-Preston Complex (BPC), Ops Town, Log Town, North Ramp and Munitions (or Ammo). CC and BPC are co-located on the east side of the base in a secured area. Transient personnel flow through the CC area, while the majority of the base has resting quarters in either the CC or BPC compound. CENTCOM Forward HQ is also located in the BPC area, along with the clinic. Ops and Log Town both provide base support functions, while the North Ramp consists of AFCENT Forward Special Operations Command, Special Operations Command Central, and the Combined Air Operations Center, as well as 379th Wing HQ. Munitions is on the far west side of the base. Al Udeid is home to the 379th Air Expeditionary Wing and the 901st Royal Air Force, as well as several other joint force tenant units.

SUMMARY: Summarized below are the key health risk estimates along with recommended follow-on medical actions, if any, that providers should be aware of. The following pages provide a list of all the identified health risks at AUAB (Table 1). As indicated in the detailed sections that follow the table, controls that have been effectively established to reduce health risk levels have been factored into this overall assessment.

Short-term health risks & medical implications:

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

Food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, typhoid/paratyphoid fever, diarrhea-protozoal) if consuming unapproved food and/or water sources.

Other endemic diseases (e.g., crimean congo hemorrhagic fever, leptospirosis, Tuberculosis (TB), meningoccal meningitis, rabies, Q fever)

Venomous animals/insects.

For personnel that consume non-approved local food, ice or water, there is a varying potential for food/waterborne diseases, (e.g., bacterial diarrhea, hepatitis A, typhoid/paratyphoid fever, diarrhea-protozoal). The health effects of these diseases can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A). Risks from food/waterborne diseases should be reduced with preventive medicine controls and mitigation, which includes hepatitis A vaccinations and only drinking from approved water sources eating from approved food sources in accordance with standing CENTCOM policy.

For other vector-borne endemic diseases (crimean congo hemorrhagic fever), 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, efforts by Pest Management to minimize the biting vectors and appropriate chemoprophylaxis.

For water contact diseases (leptospirosis) activities involving extensive contact with surface water increase risk.

For respiratory diseases (tuberculosis, meningococcal meningitis) 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 to potentially lethal effects; 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: 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 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 AUAB. Personnel who reported with symptoms or required treatment while at this site should have exposure/treatment noted in medical record (e.g., electronic medical record and/or on a Standard Form (SF) 600 (Chronological Record of Medical Care).

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Table 1. Population-Based Health Risk Estimates - AUAB, Qatar [1, 2, 5]

Source of Identified Health Risk[3]			
AIR	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
PM_{10}	Short-term: Low, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).	Limiting strenuous physical activities when air quality is especially poor; and actions such as closing tent flaps, windows, and doors.	Short-term: Low, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).
	Long-term: No health guidelines		Long-term: No health guidelines
$PM_{2.5}$	Short-term: Low-Moderate, A majority of the time mild acute (short term) health effects were anticipated; certain peak levels may have produced mild eye, nose, or throat irritation in some personnel and pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may have been exacerbated.	Limiting strenuous physical activities when air quality is especially poor; and actions such as closing tent flaps, windows, and doors.	Short-term: Low-Moderate, A majority of the time mild acute (short term) health effects were anticipated; certain peak levels may have produced mild eye, nose, or throat irritation in some personnel and pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may have been exacerbated.
	Long-term: Moderate, Small percentage of persons may have been at increased risk for developing chronic conditions (particularly those more susceptible to acute (short term) effects (e.g., those with asthma/existing respiratory diseases).		Long-term: Moderate, Small percentage of persons may have been at increased risk for developing chronic conditions (particularly those more susceptible to acute (short term) effects (e.g., those with asthma/existing respiratory diseases).
Metals	Short-term: None Identified. All detected metals were below corresponding Negligible MEG values		Short-term: None Identified. All detected metals were below corresponding Negligible MEG values
	Long-term: None Identified. All detected metals were below corresponding Negligible MEG values		Long-term: None Identified. All detected metals were below corresponding Negligible MEG values
VOCs	Short-term: None Identified		Short-term: None Identified
	Long-term: None Identified		Long-term: None Identified
Soil	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
Various Analytes	Short-term: No health guidelines		Short-term: No health guidelines
	Long-term: None Identified		Long-term: None Identified
Water	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
Consumed water	Short-term: None Identified	Bottled water used from approved sources	Short-term: None Identified
	Long-term: None Identified		Long-term: None Identified
Water used for other	Short-Term: None Identified		Short-term: None Identified

purposes	Long-Term: None Identified		Long-term: None Identified
ENDEMIC DISEASE	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
Food borne/ Waterborne	Short-term: Variable: High (Bacterial Diarrhea) to Moderate (Hepatitis A, Typhoid/Paratyphoid Fever, Diarrhea -Protozoal). If ingesting local food/water, the health effects could have been temporarily incapacitating to personnel (Diarrhea) or resulted in prolonged illness (Hepatitis A).	Preventive measures included Hepatitis A vaccination, consumption of food and water used only from approved sources and routinely monitored.	Short-term: Low
	Long-term: None Identified		Long-term: None Identified
Arthropod Vector Borne	Short-term: Moderate (Crimean Congo Hemorrhagic Fever)	Preventive measures included proper wear of the treated uniform and application of repellent to exposed skin and appropriate chemoprophylaxis.	Short-term: Low
	Long-term: None identified		Long-term: None identified
Water-Contact (e.g. wading, swimming)	Short-term: Moderate (Leptospirosis)		Short-term: Moderate
	Long-term: None Identified		Long-term: None Identified
Respiratory	Short-term: Low (Tuberculosis (TB), Meningococcal Meningitis).	TB evaluated as part of the PDHA (Post Deployment Health Assessment). A TB skin test was required post-deployment.	Short-term: Low
	Long-term: None Identified		Long-term: None Identified
Animal Contact	Short-term: Moderate (Q-Fever), Low (rabies)	CENTCOM General Order 1B mitigates rabies exposure risks by prohibiting contact with, adoption, or feeding of feral animals. Risks are further reduced in the event of assessed contact by prompt post-exposure rabies prophylaxis IAW the CDC's ACIP guidelines.	Short-term: Moderate (Q-Fever), Low (rabies)
	Long-term: Low (rabies)		Long-term: Low (rabies)
VENOMOUS ANIMAL/INSECTS	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
Snakes, Scorpions, Snails, Fish	Short-term: Low to High	Risks reduced by education, avoiding contact, and proper and timely reporting and treatment.	Short-term: Low to High (If encountered, effects of venom varied with species from mild localized swelling to potentially lethal)
	Long-term: None Identified		Long-term: None Identified
HEAT/COLD STRESS	**Unmitigated Health Risk Estimate[4]**	**Control Measures Implemented**	**Residual Health Risk Estimate[4]**
Heat	Short-term: Low to High	Risks from heat stress may have been reduced with preventive medicine controls, work-rest cycles, and mitigation	Short-term: Low to High
	Long-term: Low		Long-term: Low
Cold	Short-term: Low	Risks from cold stress may have been reduced with protective measures such as use of the buddy system in cold weather, and proper wear of protective clothing.	Short-term: Low
	Long-term: Low		Long-term: Low

NOISE	Unmitigated Health Risk Estimate[4]	Control Measures Implemented	Residual Health Risk Estimate[4]
Continuous (Flightline, equipment) Impulse (Weapon firing)	Short-term: Low	Hearing protection used by personnel in higher risk areas	Short-term: Low
	Long-term: Low-Moderate		Long-term: Low-Moderate

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

[2] This assessment was based on specific data and reports obtained from the May 2004 through September 2012 timeframe. It was considered a current representation of general site conditions but may not reflect certain fluctuations or unique exposure incidents. Acute health risk estimates were generally consistent with field-observed health effects.

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

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

1 Discussion of Health Risks at AUAB, Qatar by Source

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

2 Air

2.1 Site-Specific Sources Identified

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

Environmental surveillance occurred between 2004 and 2008. The summary of results follows.

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

2.2.1 Sample data/Notes:

Exposure Guidelines:

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

The range of 24-hour PM_{10} concentrations in 67 samples was 32 to 1803 $\mu g/m^3$.

2.2.2 Short-term health risks:

Low: Short term risk is based on comparison of daily concentrations to 24-hr MEGs. The variability in the risk is due to significant fluctuation in the daily concentrations. The risk assessment is based on sampling data from 2004-2008.

Overall 58/67 (94%) of the sampling days had concentrations below the 24-hour negligible MEG (LOW Risk); 6/67 (10%) of the sampling days were between the 24-hour negligible MEG and the 24-hour marginal MEG (LOW Risk); 0/67 (0%) of the sampling days were between the 24-hour marginal and the 24-hour critical MEG (MODERATE Risk); 3/67 (5%) of the sampling days were greater than the critical MEG (HIGH risk). Confidence is low based on limitations in sampling data.

Respiratory effects can increasingly impact real-time health and mission capabilities as they exceed higher levels of MEGs. Acute effects to relatively healthy troops are mostly eye, nose, and throat irritation, and respirator effects (sneezing, adaptive responses such as coughing, sinus congestion and drainage) that can be exacerbated by increased activity.

2.2.3 Long-term health risk:

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

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

2.3.1 Sample data/Notes:

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

The range of 24-hour $PM_{2.5}$ concentrations in 45 samples from February 2006-February 2007 was 24-350 µg/m^3, with an average concentration of 63 µg/m^3.

2.3.2 Short-term risk:

Overall 30/45 (67%) of the sampling days had concentrations below the 24-hour negligible MEG (LOW Risk); 14/45 (31%) of the sampling days were between the 24-hour negligible MEG and the 24-hour marginal MEG (LOW Risk); 1/45 (2%) of the sampling days were between the 24-hour marginal and the 24-hour critical MEG (MODERATE Risk); 0/45 (0%) of the sampling days were greater than the critical MEG (HIGH risk). Confidence is low based on limitations in sampling data.

Low: Short term risk is based on comparison of daily concentrations to 24-hr MEGs. The variability in the risk is due to significant fluctuation in the daily concentrations. The risk assessment is based on sampling data from 2006-2007.

2.3.3 Long-term health risks:
Overall 30/45 (67%) had concentrations between the negligible and marginal MEG; 15/45 (33%) of the sampling days had concentrations above the marginal MEG.

Moderate: The long-term $PM_{2.5}$ health risk assessment for AUAB was moderate based on $PM_{2.5}$ concentrations and the likelihood of exposure at these hazard severity levels. A moderate health risk assessment suggests that long-term exposure to peak $PM_{2.5}$ concentrations at AUAB were expected to have degraded mission capabilities in terms of the required mission standard and would result in reduced mission capability if hazards occurred during the mission. Confidence in the short-term $PM_{2.5}$ health risk assessment was low (TG 230, Table 3-6).

2.4 Airborne Metals from PM_{10}

2.4.1 Sample data/Notes:

Exposure Guidelines:

The health risk assessment was based on average and peak concentration of 67 PM_{10} airborne metal samples collected at AUAB from 2004-2008, and the likelihood of exposure. Risks are determined based on comparison to available MEGs “TG 230”.

2.4.2 Short and long-term health risks:

None identified based on the available sampling data: All contaminants were measured at concentrations below MEGs. Two contaminants have detection limits greater than the MEG (Cadmium, and Vanadium). Since these contaminants weren't detected in any of the samples and/or there is no expected source of these contaminants, no further assessment was needed (based on guidance in TG

230 paragraph 3.4.4.4). Confidence in this risk assessment is low based on limitations in sampling data and analytical limits of detection.

2.5 Volatile Organic Compounds (VOC)

2.5.1 The health risk assessment was based on average and peak concentration of 17 valid volatile organic chemical (VOC) air samples collected at AUAB from March 2005, June-July 2006, and the likelihood of exposure. VOCs were detected in some of the samples, but at levels below pertinent MEGs. Risks are determined based on comparison to available MEGs.

2.5.2 Short and long-term health risks:

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

3 Soil

3.1 Site-Specific Sources Identified

3.2 Sample data/Notes:

A total of 15 soil samples were collected from AUAB in 2004, 2008 to assess OEH health risk to deployed personnel. The primary soil contamination exposure pathways are dermal contact and dust inhalation. Typical parameters analyzed for included SVOCs, radionuclides, heavy metals, PCBs, pesticides, herbicides. If the contaminant was known or suspected, other parameters may have been analyzed for (i.e. total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) near fuel spills).

3.3 Short-term health risk:

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

3.4 Long-term health risk:

None identified based on available sample data. All contaminants were measured at concentrations below MEGs.

4 Water

In order to assess the health risk to US personnel from exposure to water in theater, the USAPHC 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 sole source of drinking water for all deployed personnel in Qatar. The non-potable water distribution system consists of a feed line from Ras Abu Fontas desalination plant, underground storage tanks, above storage tanks, chlorine injection, and a piped distribution system in the Coalition Compound, Blatchford-Preston Complex, Log Town, North Ramp area, and Ammo. Tanks in Ops Town carrying non-portable water are filled by water trucks. The water trucks are filled with water from a fill station in Log Town, fed by the water from the distribution system. The same water is used to supply Qatari operations on base.

4.1 Drinking Water: Bottled

4.1.1 Site-Specific Sources Identified

Drinking water supplies at AUAB are from locally procured bottled water sources approved by the US Army Public Health Command. At AUAB, Bioenvironmental Engineering conducts routine field testing per Air Force Instruction (AFI) 48-138/US Army Technical Bulletin, Medical 577 (TB MED 577), Sanitary Control and Surveillance of Field Water Supplies May 2010.

4.1.2 Sample data/Notes:

Over 5000 bacteriological samples were collected and analyzed for bottled water since 2009. All results were negative for bacteriological contamination.

2 samples were collected in 2004 and 2008. All analytes were detected at levels below the short or long term exposure levels.

Routine monitoring results are within acceptable limits. Records of these measurements are available in DOEHRS.

4.1.3 Short-term and long-term health risks:

None identified based on available sample data.

4.2 Non-Drinking Water: Treated/Disinfected

4.2.1 Site-Specific Sources Identified

Potable water used for purposes other than drinking is produced by State of Qatar Ministry of Electricity and Water using Multistage Flash Distillation of source water taken from the Persian Gulf. Treated Water is distributed to the dining facilities for cooking and hand washing. Additionally, treated water is used for showers, toilets, personal hygiene, air craft washing, etc. Routine Field testing is performed by Bioenvironmental Engineering and includes bacteriological, CBRN, FAC, and other parameters per AFI 48-138 and TB MED 577.

Although the primary route of exposure for most microorganisms was ingestion of the contaminated water, dermal exposure to some microorganisms, chemicals, and biological contaminants may have also caused adverse health effects. Complete exposure pathways would have included drinking, brushing teeth, personal hygiene, cooking, providing medical and dental care using a contaminated water supply or during dermal contact at vehicle or aircraft wash racks.

4.2.2 Sample data/Notes:

Exposure Guidelines:

16 samples collected in 2004, 2005, 2008, 2009 and 2012 were evaluated for this health risk assessment.

Analytes were not detected or not consistently detected at levels above the short or long term MEGs. No analyte exceeded 2.5 times the MEG to be retained as a hazard.

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

4.2.3 Short and long-term health risks:

None identified based on available sample data

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons

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

5.2 Depleted Uranium (DU)

DU is a component of some aircraft and munitions that are currently on AUAB. However, no abandoned/damaged DU is known to exist.

All radioactive materials are accounted for, and are properly stored and maintained.

5.3 Ionizing Radiation

5.3.1 Medical and dental radiography is utilized in the EMEDS Clinic. Industrial radiography is utilized in Building 3937. All ionizing radiation exposures for occupational radiation workers were below the occupational exposure limits. The base also has equipment containing sealed radioactive material, including chemical agent monitors and alarms, moisture density gauges and targeting pods. Security Forces personnel use an x-ray backscatter device for vehicles entering the gate. Administrative procedures are in place to protect service members. AF workplace-specific evaluations are available in the MESL and/or DOEHRS. All radioactive materials are accounted for, and are properly stored and maintained.

5.3.2 Short-term and long-term health risks:

Low: Procedures are in place to maintain exposures as low as reasonable achievable. Confidence in this risk is high.

5.4 Non-Ionizing Radiation

5.4.1 Lasers:

Aircraft are equipped with various lasers. Specific health hazards associated with each laser are documented in DOEHRS. Administrative procedures are in place to reduce incidents. The biggest risk is lasing of aircrews while flying. In some cases, crews were able don Aircrew Laser Eye Protection within time and perform adequate procedures to avoid exposure. Laser exposures evaluations completed by the Flight Doctors are forwarded to the USAF School of Aerospace Medicine Help Desk for archiving and placed in the member's medical record.

5.4.2 Electro-Magnetic Frequency (EMF) Radiation:

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

5.4.3 Short and long-term health risks:

Low: Procedures are in place to maintain exposures below the permissible exposure limits. Confidence in this risk assessment is medium.

6 Endemic Disease[1]

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

6.1 Foodborne and Waterborne Diseases

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

6.1.1 Diarrheal Diseases (Bacteriological)

Unmitigated High - Mitigated Low: Mitigation was in place, U.S. Forces were provided food and water from approved sources. Diarrheal diseases can be expected to temporarily incapacitate a very high percentage of personnel (potentially over 50 percent per month) within days if local food, water, or

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

ice is consumed. Field conditions (including lack of hand washing and primitive sanitation) may facilitate person-to-person spread and epidemics. Typically mild disease treated in outpatient setting; recovery and return to duty in less than 72 hours with appropriate therapy. A small proportion of infections may require greater than 72 hours limited duty, or hospitalization.

6.1.2 Hepatitis A

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

6.1.3 Typhoid / Paratyphoid Fever

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

6.1.4 Diarrhea - Protozoal

Unmitigated Moderate – Mitigated Low: Mitigation was in place, US personnel do not drink untreated water. Risk was typically highest following spring floods. In general, Cryptosporidium spp., Entamoeba histolytica, and Giardia lamblia were the most common protozoal causes of diarrhea wherever sanitary conditions are significantly below U.S. standards. A small number of cases (less than 1% per month attack rate) could have occurred among personnel consuming local food, water, or ice. Outbreaks affecting a higher percentage of personnel were possible with Cryptosporidium. Symptomatic cases varied in severity; typically mild disease demonstrating recovery and return to duty in less than 72 hours with appropriate therapy; severe cases may require 1 to 7 days of supportive care, followed by return to duty.

6.1.5 Short-term Health Risks:

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

6.1.6 Long-term Health Risks:

None identified based on available data.

6.2 Arthropod Vector-Borne Diseases

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

6.2.1 Crimean-Congo hemorrhagic fever

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

6.2.7 Short and long-term health risks:

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

6.2.8 Long-term health risks:

None identified based on available data.

6.3 Water Contact Diseases

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

6.3.1 Leptospirosis

Moderate: Leptospirosis risk is moderate year-round. The disease is present in Qatar, but at unknown levels. Data are insufficient to assess potential disease rates, up to 1-10 percent of personnel wading or swimming in bodies of water such as lakes, streams, or irrigated fields could be affected per month.

Human infection occurs through exposure to water or soil contaminated by infected animals and has been associated with wading, and swimming in contaminated, untreated open water. Leptospirosis can enter the body through cut or abraded skin, mucous membranes, and conjunctivae. Ingestion of contaminated water can also lead to infection. The acute generalized illness associated with infection can mimic other tropical diseases (for example, dengue fever, malaria, and typhus), and common symptoms include fever, chills, myalgia, nausea, diarrhea, cough, and conjunctival suffusion. Manifestations of severe disease can include jaundice, renal failure, hemorrhage, pneumonitis, and hemodynamic collapse. Recreational activities involving extensive water contact may result in personnel being temporarily debilitated with leptospirosis.

6.3.2 Short-term health risks:

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

6.3.3 Long-term health risks:

None identified based on available data.

6.4 Respiratory Diseases

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

6.4.1 Tuberculosis (TB)

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

6.4.2 Meningococcal Meningitis

Low: Potential health risk to U.S. personnel was Low year round. However, the health risk may have been elevated during cooler months. Asymptomatic colonization and carriage of meningococcal bacteria was common worldwide, including within U.S. military populations; rare symptomatic cases may have occured periodically in military populations, regardless of geographic location. Meningococcal meningitis is potentially a very severe disease typically requiring intensive care; fatalities may occur in 5-15% of cases.

6.4.3 Short-term health risks:

Low: Confidence in the health risk estimate was Medium

6.4.4 Long-term health risks:

None identified based on available data.

6.5 Animal-Contact Diseases

6.5.1 Q-Fever

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

6.5.2 Rabies

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

6.5.3 Short-term health risks:

Variable (Low to Moderate): Low for rabies, Moderate for Q-fever. Confidence in the health risk estimate was Medium.

6.5.4 Long-term health risks:

Low: The long term risk for rabies was Low.

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7 Venomous Animal/Insect

All information was taken directly from the Clinical Toxinology Resources web site (http://www.toxinology.com) from the University of Adelaide, Australia and from the Armed Forces Pest Management Board Living Hazards Database (http://www.afpmb.org/content/living-hazards-database). The species listed below have home ranges that overlap the location of Qatar and may have presented a health risk if they were encountered by personnel. Personnel at AUAB experience minimal sightings or contact.

7.1 Scorpions

- Androctonus crassicauda (Black Scorpion): Severe envenoming possible, potentially lethal. Cardiotoxicity may be direct or indirect, but is a feature of severe envenoming, with cardiac arrhythmias, cardiac failure.
- Buthacus yotvatensis, Buthacus lepochelys, Compsobuthus arabicus, Orthochirus scrobiculosus: There are a number of dangerous Buthid scorpions, but also others known to cause minimal effects only. Without clinical data it is unclear where this species fits within that spectrum.

7.2 Snakes

- Astrotia stokesii (Stokes' Sea Snake), Enhydrina schistosa (Beaked Sea Snake), Hydrophis cyanocinctus (Asian Annulated Sea Snake), Hydrophis gracilis (Graceful Small-headed Sea Snake) Hydrophis lapemoides (Persian Gulf Sea Snake) Hydrophis ornatus (Reef Sea Snake), Hydrophis spiralis (Yellow Sea Snake), Lapemis curtus (Shaw's Sea Snake), Pelamis platurus (Yellow Bellied Sea Snake), Thalassophina viperina (Olive Sea Snake): Sea snake bites vary from trivial to lethal envenoming.

- Cerastes gasperettii (Gasperetti's Horned Sand Viper): Significant local effects and systemic effects, including coagulopathy can occur.

- Echis coloratus (Burton's carpet viper), Echis sochureki (Sochurek's Saw-scaled Viper), Macrovipera lebetina (Blunt-nosed Viper): Severe envenoming possible, potentially lethal.

7.3 Snails/Fish

- Conus textile (Snails): Serious & painful envenomations (sometimes fatal) usually occur when swimmers (waders) pick up shells with live snails still inside
- Synanceja trachynis (Stone fish), Pterois volitans (Lionfish): Very potent neurotoxin w/ cytotoxic & possibly hemolytic factors

7.4 Short-term health risk:

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

7.5 Long-term health risk:

None identified.

8 Heat/Cold Stress

Qatar's climate is subtropical dry, hot desert climate with low annual rainfall, very high temperatures in summer and a big difference between maximum and minimum temperatures. The scarce annual precipitation, usually averaging less than 130 mm (5 in), falls during winter in short, torrential downpours.

8.1 Heat

Summer (March through October) brings dust storms and high temperatures.

The health risk of heat stress/injury based on temperatures alone is Low (< 78 °F) in December - January, High (82-87.9°F) in February, November and extremely high (≥ 88°F) from March – October. However, work intensity and clothing/equipment worn pose greater health risk of heat stress/injury than environmental factors alone (Goldman, 2001).

Personnel are educated on dangers of heat stress, water intake, work/rest cycles, and other preventive measures.

8.1.1 Short-term health risk:

Low to High: High health risk of heat injury in unacclimatized personnel from March to October, and Low from November to February. The risk of heat injury was reduced through preventive measures. Because the occurrence of heat stress/injury is strongly dependent on operational factors (work intensity and clothing), confidence in the health risk estimate was low (TG 230, Table 3-6).

8.1.2 Long-term health risk:

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

8.2 Cold

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

8.2.1 Short-term health risks:

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

8.2.2 Long-term health risk:

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

9 Noise

9.1 Continuous

Occupational and Environmental Health Assessments at AUAB indicate the potential for hazardous when working on or near the flightline and/or industrial shops. Appropriate hearing protection is provided for all individuals in shops which generate or are exposed to hazardous noise. Site-specific workplace surveillance data is available in DOEHRS and/or MESL.

9.1.1 Short-term health risks:

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

9.1.2 Long-term health risks:

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

9.2 Impulse

While some potential for impulse noise may be from shop equipment, most of the exposure is limited to certain specialties (i.e. Security Forces, Explosive Ordinance Disposal, etc.). These workplace-specific exposures are documented in DOEHRS.

9.2.1 Short-term health risks

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

9.2.2 Long-term health risks:

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

10 Unique Incidents/Concerns

10.1 Potential environmental contamination sources

DoD personnel are exposed to various chemical, physical, ergonomic, and biological hazards in the course of performing their mission. These types of hazards depend on the mission of the unit and the operations and tasks which the personnel are required to perform to complete their mission. The health risk associated with these hazards depends on a number of elements including what materials are used, how long the exposure last, what is done to the material, the environment where the task or operation is performed, and what controls are used. These process and hazards are identified and evaluated in DOEHRS for the corresponding work centers. Exposures to these occupational hazards can occur through inhalation (air), skin contact, or ingestion; however exposures through air are generally associated with the highest health risk.

10.2 Waste Sites/Waste Disposal

10.2.1 Site specific sources identified:

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

10.2.2 Short and Long-Term Health Risks:

None identified based on available data

10.3 Fuel/petroleum products/industrial chemical spills:

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

10.4 Pesticides/Pest Control:

Much of the pest control at this site consists of trapping and small area treatment for ants, spiders, rodents with baits, glue boxes, and pyrethroids. Larvicides are used for mosquito larval control. Some limited area residual pest control is performed to control mosquitoes in isolated locations. Personnel may have been incidentally exposed to very low levels of pesticide during pest control operations.

10.4.1 Short-term and Long-term health risks

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

10.5 Asbestos

There is no specific information available to assess this hazard.

10.6 Lead Based Paint

Lead-based paint was used at AUAB. Facilities are well-maintained, and there are no known areas where paint is flaking or peeling. All previously flaking or peeling areas were mitigated. Lead-based paint has been identified in Fire Station 1.

10.6.1 Short-term and Long-term health risks

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

11 References[2]

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

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

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

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

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

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

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

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

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

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

11. Modification 11 to United States Central Command Individual Protection and Individual, Unit Deployment Policy, 2 December 2011. (Previous versions of this policy can be obtained from the CENTCOM SG office)

12. USA PHC TG230, June 2010 Revision.

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

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

12 Where Do I Get More Information?

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