

Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Abdullah al Mubarak Air Base (AAMAB), Kuwait (Kuwait City International
Airport, KCIA)

AUTHORITY: This periodic occupational and environmental monitoring summary (POEMS) has been developed in accordance with Department of Defense (DoD) Instructions 6490.03, *Deployment Health*, 2006, 6055.05, Occupational and Environmental Health, 2008, and JCSM (MCM) 0028-07, *Procedures for Deployment Health Surveillance*, 2007.

PURPOSE: This POEMS documents the DoD assessment of base camp level occupational and environmental health (OEH) exposure data for AAMAB. It presents the identified health risks and associated medical implications. The findings are based on information collected from January 2003 through December 2010 to include OEH 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 risks pertaining to historic or future conditions at this site, the underlying data is limited to the time period(s) and area(s) sampled and thus may not reflect fluctuations or unique occurrences. It also may not be fully representative of all the fluctuations during the timeframe. To the extent data allow, this summary describes the general ambient conditions at the site and characterizes the 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: **AAMAB** is located at the Kuwait City International Airport just south of Kuwait City. The installation is the headquarters for the Kuwaiti Air Force. The major U.S. military tenants are the Air Force's 387th Air Expeditionary Group (387 AEG), 5th Expeditionary Air Mobility Squadron (5 EAMS), and the Army's Theater Mortuary Evacuation Point (TMEP).

SUMMARY: The following table provides a list of the overall identified health risks at AAMAB. Summarized below are the key health risks estimated to present a moderate or greater risk of medical concern along with recommended follow-on medical actions that providers should be aware. As indicated in the detailed sections that follow the table, controls that have been effectively established to reduce risk levels have been factored into this overall assessment. In some cases, e.g. ambient air, specific controls are noted but not routinely available/feasible.

Short-term health risks & medical implications: The following may have caused acute (short-term) health effects in some personnel deployed to **AAMAB**: inhalable coarse particulate matter (PM₁₀), food-borne/water-borne diseases (hepatitis A, typhoid fever, protozoal diarrhea); High (bacterial diarrhea), vector borne diseases (visceral leishmaniasis), water-contact diseases (leptospirosis), animal contact diseases (Q-fever), and heat stress. Preventive medicine measures such as vaccines (for Hepatitis A and Typhoid fever), consuming only DoD-approved food/water, etc. reduce some disease risk to Low or None. While for the most part any associated effects from the above should have resolved post-deployment, providers should be prepared to consider relationships to current complaints. Personnel who reported with symptoms or required treatment while at this site should have exposure/treatment noted in medical records/on SF600 or in the electronic health record.

Long-term health risks & medical implications: The types of hazards associated with potential long-term health effects at AAMAB include continuous and, in individual workplaces, impulse noise. Health care providers should consider overall individual health status (e.g., any underlying

conditions/susceptibilities) when evaluating patients. Likewise—especially for noise hazards—providers should consider any potential unique individual exposures (such as occupational or specific personal dosimeter data) when assessing individual concerns. For example, certain individuals need to be followed/evaluated for specific occupational exposures/injuries (e.g., annual audiograms as part of the medical surveillance for those enrolled in the Hearing Conservation Program; and personnel covered by Respiratory Protection Program and/or Hazardous Waste/Emergency Responders Medical Surveillance).

Population-Based Health Risk Estimates – [Abdullah al Mubarak Air Base, Kuwait]^{1,2}

Sources of Identified Health Risk ³	Health Risk Assessment Summary ⁴	
	Short Term Health Risk	Long Term Health Risks
AIR	Airborne Substances – Overall Short Term Risks: Variable: Low to High	Airborne Substances – Overall Long-Term Risks: Low
Particulate Matter (PM ₁₀)	Variable (Low to High): 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).	Not evaluated-no available health guidelines.
Metals	Low	Low
SOIL	Soil - Overall Short Term Risks: Not evaluated	Soil - Overall Long Term Risks: Low
Metals, organic and inorganic compounds	Not evaluated per current USAPHC protocols	Low
WATER	Water - Overall Short Term Risks: Low	Water- Overall Long Term Risks: Low
Used for other purposes (personal hygiene, cooking, etc)	Low	Low
MILITARY UNIQUE	Military Unique – Overall Short Term Risks: Low	Military Unique – Overall Long Term Risks: Low
(e.g. CBRN; Depleted Uranium; Ionizing/Non ionizing radiation)	Low	Low
ENDEMIC DISEASE	Endemic Disease – Overall Short Term Risks: Low to High	Endemic Disease – Overall Long Term Risks: None Identified
Foodborne and Waterborne	Variable Low to High: Low: (hepatitis E, brucellosis); Moderate (hepatitis A, typhoid fever, protozoal diarrhea); High (bacterial diarrhea)	None Identified
Arthropod Vector-Borne	Variable Low to Moderate: Low (visceral leishmaniasis, sandfly fever, West Nile fever, sindbis, Moderate: (visceral leishmaniasis)	None Identified
Respiratory	Low (meningococcal meningitis, tuberculosis)	A TB skin test is required post-deployment if potentially exposed to TB.
Water-Contact (e.g. wading, swimming)	Moderate: Leptospirosis	None Identified
Animal Contact	Variable Low to Moderate: Low: (H5N1 avian influenza, rabies), Moderate: (Q-fever)	None Identified
Aerosolized Dust or Soil Contact	Low (hantavirus hemorrhagic fever with renal syndrome)	
HEAT/COLD STRESS	Heat/Cold - Overall Short Term Risks: Low to Moderate	Heat/Cold- Overall Long Term Risks: Low
Heat	Variable Low to Moderate. Risk reduced to Low with preventive medicine controls/mitigation	None Identified

Abdullah al Mubarak Air Base, Kuwait: 2003 to 2010

Sources of Identified Health Risk ³	Health Risk Assessment Summary ⁴	
	Short Term Health Risk	Long Term Health Risks
Cold	Low	Low
NOISE	Noise – Overall Short Term Risks: Low	Noise – Overall Long Term Risks: Low to Moderate
Continuous	Low	Low to Moderate: workers in some workplaces and on the flightline. Hearing protection is provided when required.
Impulse	Low	Low

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 Abdullah al Mubarak Air Base. 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 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 which could result in a significant individual exposure. Any such person seeking medical care should have their specific exposure documented in an SF600 or equivalent.

² This assessment is based on specific data and reports obtained from the January 2003 – December 2010 timeframe. It is considered a current representation of general site conditions but may not reflect certain fluctuations or unique exposure incidents. Short term health risk estimates are generally consistent with field-observed health effects.

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 AAMAB. The health risks are presented as Low, Moderate, High or Extremely High for both short term and long term health effects. The risk level is 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 USAFSAM. Where applicable, "None Identified" is used when though an exposure was identified, no risk of either a specific acute or chronic health effects were determined. More detailed descriptions of OEH exposures that were evaluated but determined to pose no health risk are discussed in the following sections of this report.

⁴ Risks in this summary table are based on quantitative surveillance thresholds 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 select few samples.

⁵ Risks for endemic diseases and host/vector/pathogen surveillance are based on the National Center for Medical Intelligence's Risk Assessment Methodology found at <https://www.intelink.gov/ncmi/index.php>

1 Discussion of Health Risks at AAMAB

The major source categories of potential health risk that were evaluated at AAMAB are described below. The evaluation process includes identifying what, if any, specific sub-categories/health concerns are present. This initial step results in “screening out” certain sub-categories that pose no identifiable health risk (for example if all data is below screening levels). While this discusses sub-categories that have been determined to present no identifiable health risk, the Summary Table on the previous page only contains those sub-categories that were determined to pose some level of potential health risk.

Limitations:

1. Sampling data used for this assessment is derived from USAPHC-Main, with some water and soil analyses conducted by USAPHC-Europe included.
2. The health risk assessments are based on retrospective analysis of sampling data and limited field notes. Assumptions regarding representativeness and duration of exposure were necessary.
3. In general, samples weren't collected with the intent of characterizing a mean and/or range of exposures. The data presented in the POEMS represents the mean of the existing sampling data, not the mean exposure. The same is true for the percentages at each risk level (i.e. the percentages indicate the percentage of days that exceeded a MEG.)

2 Air

2.1 Site-Specific Sources Identified

Airborne environmental hazards around AAMAB include agricultural and vehicles. Typical military operations, including vehicular traffic, aircraft operations and other local sources will also contribute to the ambient environment at these locations.

Limited environmental surveillance occurred between 2003 and 2010. The summary of results follows.

2.2 Particulate Matter, less than 10 microns (PM₁₀).

2.2.1 Sample data/notes:

Exposure Guidelines: Short-term (24-hour) PM₁₀ MEGs micrograms per cubic meter (µg/m³): Negligible MEG=250, Marginal MEG=420, Critical MEG=600; Long-term MEG: Not Available (see chronic risk note). Degree of risk is estimated based on comparison of concentrations to specified MEGs.

The range of 24-hour PM₁₀ concentrations in 64 samples from May 2003 through August 2006 was 61.2 to 1057.3 µg/m³. The average concentration was 234.6 µg/m³, the standard deviation was 167.4 µg/m³ and the median was 182.5 µg/m³. There were no sample results available prior to 2003 or from 2007-2010.

2.2.2 Short-term health risk:

Overall risk is variable from Low to High. The variability in risk is due to daily fluctuations in PM concentrations. This risk assessment is based on data from 2003 and 2004 only because all other years had too few samples to conduct a proper risk assessment. 23/50 (46%) sampling days with concentrations less than the 24-hour negligible MEG (LOW Risk), 21/50 (42%) sampling days with

concentrations between the 24-hour negligible and marginal MEGs (LOW Risk), 4/50 (8%) sampling days between the marginal and critical MEGs, and 2/50 (4%) sampling days with concentrations greater than the critical MEGs (HIGH Risk). Confidence in this risk assessment is low based on small data set and 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 respiratory effects (sneezing, adaptive responses such as coughing, sinus congestion and drainage) that can be exacerbated by increased activity. These effects are consistent with those generally reported from the field.

2.2.3 Long-term health risk:

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

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

2.3.1 Sample data/notes:

Exposure Guidelines micrograms per cubic meter (µg/m³): Short-term (24-hour) PM_{2.5} MEGs (µg/m³): Negligible MEG=65, Marginal MEG=250, Critical MEG=500; Long-term PM_{2.5} MEGs: Negligible MEG=15, Marginal MEG=65.

One PM_{2.5} sample was collected from in December 2005. No data was available for all other years. The measured concentration in the December 2005 sample was 142.72 µg/m³.

2.3.2 Short and long-term health risk:

Risk assessment not performed. One sample over the time period is insufficient to perform an accurate risk assessment.

2.4 Metals

2.4.1 Sample data/notes:

Sixty-four samples were taken from May 2003 through August 2006 and sent to USAPHC for metals analysis. There were no sample results available for 2007 through 2010. Risks are determined based on comparison to available MEGs. None of the analyzed metals were found in concentrations above a short term or long term MEG.

2.4.2 Short and long-term health risks:

Low. All contaminants were measured at concentrations below MEGs. Three contaminants (Beryllium, Cadmium, and Vanadium) have detection limits greater than the MEG. Since these contaminants weren't detected in any of the samples and there is no expected source of these contaminants, no further assessment was required IAW 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 Chemical Pollutants (gases and vapors)

2.5.1 Sample data/notes:

Two ambient air volatile organic compounds (VOC) samples were collected between December 2002 – February 2004. VOCs were detected some of the samples, but at levels below the pertinent MEGs. Risks are determined based on comparison to available MEGs.

2.5.2 Short and long-term health risks:

Risk assessment not performed. Two samples over the time period provide insufficient data to conduct a risk assessment. For both samples, the limit of detection for 1,2-Dibromo-3-chloropropane (a soil fumigant no longer used in the US) is greater than the 1 year negligible MEG, which makes it difficult to know the true relationship to the MEG and causes uncertainty in the evaluation. 1,2-Dibromo-3-chloropropane wasn't detected in local non-drinking water samples and there is no indication of contamination. Confidence in this risk assessment is low due to limitations in the sampling data.

3 Soil

3.1.1 Sample data/notes:

Thirteen soil samples were collected from March 2003 through September 2004 and sent to USAPHC for analysis. Analyses included metals, volatile organic compounds, herbicides, insecticides, radiological, and semi-volatile organic compounds,

No soil samples were collected in all other years. Risks are determined based on comparison to available MEGs. There were no contaminants detected at levels greater than the 1-year negligible MEG.

3.1.2 Short-term health risks:

Currently, sampling data for soil is not evaluated in an acute risk assessment.

3.1.3 Long-term health risks

Low. All contaminants measured at concentrations below MEGs. Confidence in this assessment is low due small sample set and limitations in sampling data.

4 Water

Bottled water is the primary source of drinking water for all deployed personnel in Kuwait. The distributors and all brands of bottled water are approved by the Army's Veterinary Command. The bottled water for the Movement Control Team is purchased by the Army and is tested and cleared by the environmental division of CSA contracting company. Monitoring includes total coliform presence/absence and *E. coli*. Bottled water purchased by the Air Force for the AAMAB is tested by base Bioenvironmental Engineering. When a new lot is received it is not released for base distribution until tested and cleared by Bioenvironmental Engineering. The AF monitoring includes total coliform presence/absence and *E. coli* for four bottles per lot. In addition, one random bottle of water is tested monthly for evidence of chemical agent contamination using the M-272 kit.

Desalinated seawater is the primary source of potable water in Kuwait. The water is filtered and treated to meet Kuwaiti Environmental Public Authority standards. The water distribution system on AAMAB is used for personal hygiene, cooking, and dishwashing. The system may become contaminated during distribution because of aging or corroded pipes, poor system integrity, pressure fluctuations from power shortages causing back siphoning, and subsequent microbial or chemical infiltration. A complete assessment of the Kuwait water distribution system is not possible due to access and travel restrictions.

Routine testing of tap water is conducted monthly at AAMAB by Bioenvironmental Engineering. Monitoring includes total coliform presence/absence and *E. coli*, pH, chlorine residual, and M272. Additionally, an annual comprehensive screening analysis is taken and submitted to USAPHC IAW Air Force Manual (AFMAN) 48-138. All results are loaded in DOEHRS.

4.1 Drinking Water - Bottled

4.1.1 *Sample data/notes:*

In addition to the field testing described above, one bottled water sample was taken in June 2005 and sent to USAPHC for analysis. No samples were available for all other years. Risks are determined based on comparison to available MEGs. None of the analytes were found at concentrations greater than a long term or short term MEG.

4.1.2 *Short and long-term health risks:*

Risk assessment not performed; one sample collected over the timeframe is not an adequate amount of data for an assessment of health risk.

4.2 Water: Used for Other Purposes (Personal Hygiene, Cooking, Showering, etc.)

4.2.1 *Sample data/notes:*

Six samples were collected for broad-spectrum analysis at AAMAB from March 2003 through June 2010 (two in 2003, 3 in 2004 and 1 in 2010). No samples were available for 2005 through 2009. Risks are determined based on comparison to available MEGs. None of the analytes were found at concentrations greater than a long term or short term MEG. Sample analysis varied depending on individual requests at the time of sample collection.

4.2.2 *Short and long-term health risks:*

Low. All samples results were below respective MEGs. Confidence in this risk assessment is low due to the small data set and limitations in the sampling data.

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons:

No specific hazard sources documented in DOEHRS or the DoD OEHS Portal.

5.2 Depleted Uranium (DU):

No specific hazard sources documented in DOEHRS or the DoD OEHS Portal.

5.3 Ionizing Radiation:

5.3.1 *Summary of exposures*

Industrial radiography is used at the personnel and vehicle search area (VSA) at Charlie 1 Post. A scatter radiation survey was performed on the backscatter system used at the VSA. Results of survey indicate exposures are below the general population authorized dose of 100 mrem per year per AF Instruction 48-148, *Ionizing Radiation Protection*.

5.3.2 *Short and long-term health risks:*

Low. Procedures are in place to maintain exposures as low as reasonably achievable. Confidence in this risk assessment is medium.

5.4 Non-Ionizing Radiation:

5.4.1 *Summary of exposures*

- 1) Lasers: The C-17 aircraft has a LAIRCM with a Nominal Optical Hazard Distance (NOHD) of 200 ft. 387 ESFS personnel may have the AN/PEQ-2A which has a NOHD up to 263 meters. Administrative procedures are in place to minimize incidents. The biggest risk is lasing of

aircrews while flying. All personnel lased are evaluated by a flight surgeon, and if follow-on care is deemed necessary an optometrist at Camp Arifjan. This exposure is documented on the SF600 and placed in their medical record.

- 2) Radio Frequency: Aircraft emitters have administrative processes in place to reduce the potential for exposures. 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 386 EMDG/SGPB for any potential exposure to EMF radiation to be investigated and documented.

5.4.2 Short 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 Disease¹

All information was taken directly from the National Center for Medical Intelligence (NCMI) (<https://www.intelink.gov/ncmi/country.php?country=KGZ>). Baseline Infectious Disease Risk Assessment for Kuwait - dated in 27 May 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.

Overall, Kuwait is considered a low risk country for infectious disease

6.1 Foodborne and Waterborne Diseases

Food borne and waterborne diseases in the area are transmitted through the consumption of local food and water. Consumption of locally procured food and water may increase US personnel's risk for illness and/or infection but severity is most likely mild gastrointestinal. Key disease risks are summarized below:

6.1.1 Diarrheal diseases (bacteriological)

High risk year-round. 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 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, typhoid fever, and diarrhea- protozoal

Moderate risk year-round. A small percentage of personnel, (0.1 to 1 percent 1per month) have a moderate risk if no preventive medicine measures are taken. However, because all deployed U.S. Forces, including civilians and contractors, are supposed to be vaccinated for Hepatitis A and Typhoid fever, no risk is identified for U.S. Forces from Hepatitis A and Typhoid fever. Diarrhea- -

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.

protozoal has a moderate risk estimate if no preventive medicine measures are taken to mitigate. Though much rarer, other potential diseases in this area with a Low risk estimate include hepatitis E and brucellosis.

6.1.3 Short and long-term health risks:

Short-term health risks: The overall short-term risk associated with foodborne and waterborne diseases at AAMAB ranged from High (for bacterial diarrhea) to Low (Hepatitis E and brucellosis) if local food or water is consumed. Preventive Medicine measures such as vaccinations reduce the risk estimate to Low to None (for Hepatitis A, typhoid fever, and diarrhea-protozoal). Additionally, U.S. Forces are provided food and water from approved sources. Confidence in risk estimate is medium.

Long-term health risks: None identified based on available data. Confidence in risk estimate is medium.

6.2 Arthropod Vector-Borne Diseases

During warmer months (approximately June to September), ecological conditions areas support arthropod vectors, including mosquitoes, ticks, and sandflies, with variable rates of disease transmission. Because Kuwait lacks adequate diagnostic capability, vector-borne diseases frequently are underreported, and there is a reliance on clinical (symptom-based, vs. laboratory confirmation- based) diagnosis.

6.2.1 Leishmaniasis

Moderate for cutaneous and low risk for the visceral. Leishmaniasis is transmitted by sand flies. The disease risk is highest when sand flies are most prevalent in April through October. Visceral leishmaniasis causes a severe febrile illness, which typically requires hospitalization with convalescence over 7 days.

6.2.2 Sindbis (and Sindbis-like viruses)

Sindbis is a low risk with rare cases present year-round with the peak season April through October. The virus is transmitted by mosquitoes and is maintained in nature by transmission between vertebrate (bird) hosts and invertebrate (mosquito) vectors. Humans are infected with Sindbis virus when bitten by an infected mosquito.

6.2.3 Sandfly fever

Sandfly fever is a low risk year-round with the peak season April through October. It is transmitted by sandflies and occurs more commonly in children though adults are still at risk. Incidents can result in debilitating febrile illness typically requiring 1-7 days of supportive care followed by return to duty

6.2.4 Typhus – fleaborne

Typhus-flea borne has a low risk with rare cases possible. The disease is transmitted by rat fleas infected with the bacteria that cause endemic typhus fever. Infected rat fleas pass infected feces while taking a blood meal from a person. People are infected when infected rat flea feces come into contact with small cuts on the skin. The bite of an infected rat flea may also spread illness to humans. West Nile fever

6.2.5 West Nile fever

West Nile fever is a low risk year-round with the peak season April through October. The disease is maintained by the bird population and mosquitoes that help to transfer the diseases from birds to humans. The majority of infections in young, healthy adults are asymptomatic although it can

result in fever, headache, tiredness, and body aches, occasionally with a skin rash (on the trunk of the body) and swollen lymph glands. This disease is associated with a low risk estimate.

6.2.6 *Short and long-term health risks*

Short-term health risks: Variable. Moderate (cutaneous leishmaniasis) to Low (visceral leishmaniasis, Sindbis (and Sindbis-like viruses), Sandfly fever, Typhus-fleaborne, and West Nile fever). Confidence in risk estimate is medium.

Long-term health risks: None identified based on available data. Confidence in risk estimate is medium.

6.3 Water Contact Diseases

Areas along rivers and lakes are the primary risk areas for water contact diseases and the risk period is seasonal, typically June through September. Any tactical operations or recreational activities that involve extensive contact with surface water (lakes, streams, rivers, or flooded fields) may cause significant exposure to leptospirosis.

6.3.1 *Leptospirosis*

Leptospirosis country risk is moderate year-round with peak season April through October. The disease is present in Kuwait, 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 and long-term health risks*

Short-term health risks: Low due to countermeasures in place (for Leptospirosis). Confidence in risk estimate is medium.

Long-term health risks: None identified based on available data. Confidence in risk estimate is medium.

6.4 Respiratory Diseases

6.4.1 *Tuberculosis (TB)*

Tuberculosis (TB) poses a moderate year round risk to U.S. personnel. Tuberculosis is usually transmitted through close and prolonged exposure to an active case of pulmonary or laryngeal tuberculosis, but can also occur with incidental contact. The Army SG has defined increased risk in deployed Soldiers as indoor exposure to locals or third country nationals of greater than one hour per week in a highly-endemic active TB region.

6.4.2 *Meningococcal meningitis*

Meningococcal meningitis poses a low risk year-round and is transmitted from person to person through droplets of respiratory or throat secretions. Close and prolonged contact facilitates the spread of this disease.

6.4.3 Short and long-term health risks:

Short-term health risks: Low (for tuberculosis and meningococcal meningitis). Confidence in risk estimate is medium.

Long-term health risks: None identified. TB is evaluated as part of the PDHA (Post Deployment Health Assessment). A TB skin test is required post-deployment if potentially exposed.

6.5 Animal-Contact Diseases

6.5.1 Q-Fever

Q-Fever poses a year-round moderate risk. Rare cases are possible among personnel exposed to aerosols from infected animals, with clusters of cases possible in some situations. Significant outbreaks (affecting 1-50 percent) can occur in personnel with heavy exposure to barnyards or other areas where animals are kept. Unpasteurized milk may also transmit infection. The primary route of exposure is respiratory, with an infectious dose as low as a single organism.

6.5.2 Rabies

Rabies poses a year-round low risk. Occurrence is well above U.S. levels due to the lack of organized control programs. Rabies is transmitted by exposure to the virus-laden saliva of an infected animal, typically through bites, but could occur from scratches contaminated with the saliva.

6.5.3 H5N1 avian influenza

H5N1 avian influenza poses a low risk. Extremely rare cases may occur in U.S. personnel who have close contact with birds or poultry infected with H5N1.

6.5.4 Short and long-term health risks

Short-term health risks: Variable. Moderate (for Q-fever) to Low (for rabies and H5N1 avian influenza) short-term risk due to rare occurrence. Confidence in risk estimate is medium.

Long-term health risks: None identified based on available data. Confidence in risk estimate is medium.

6.6 Aerosolized Dust or Soil Contact disease

6.6.1 Hantavirus hemorrhagic fever with renal syndrome (HFRS)

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

6.6.2 Short and long-term health risks

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

Long-term health risks: None identified based on available data. Confidence in risk estimate is medium.

7 Venemous Animal/Insect

7.1 Snakes, scorpions, and spiders

Routine pest control measures are conducted at this location. Venomous animals/insects are present in the country including Arabian horned viper, death stalker scorpion, blunt-nosed viper, Persian horned viper, large-clawed scorpion, golden desert scorpion, and the desert cobra. However, personnel at AAMAB experience minimal sightings or contact.

8 Heat/Cold Stress

8.1 Heat

8.1.1 Summary of exposure

Kuwait has a subtropical desert climate with two distinct seasons. Summer (May through October) produces a maximum high temperature of 46°C (115°F) and a minimum low of 23°C (73°F), with a mean daily high temperature of 42°C (108°F) and a mean daily low temperature of 27°C (81°F). Diurnal temperatures can vary as much as 10°C (18°F). Frequent sandstorms caused by arid shamal winds blow across the Persian Gulf. Temperature extremes can increase the potential for heat related injuries, including dehydration, heat exhaustion, and heat stroke. Measures are in place to mitigate more serious effects of this critical hazard.

8.1.2 Short and long-term health risks:

Short-term risk: Moderate in unacclimatized personnel. Risk is reduced to Low through preventive medicine measures. Confidence in this risk assessment is medium.

Long-term risk: Long-term health implications from heat injury are rare but can occur – especially from more serious heat injuries such as heat stroke. The overall long-term risk though may be greater to certain susceptible persons – those older (>45), in lesser physical shape, or with underlying medical/health conditions. Confidence in this risk assessment is medium.

8.2 Cold

8.2.1 Summary of exposures

Winter (November through April) produces a maximum high temperature of 31°C (88°F) and a minimum low temperature of 8°C (46°F), with a mean daily high temperature of 23°C (73°F) and a mean daily low temperature of 12°C (54°F). Winter brings all of Kuwait's annual precipitation (5 to 28 millimeters; 0.2 to 1 inch), which sometimes is heavy enough to produce minor local flooding.

Cold environments pose a threat to the individual if they exceed the capacity of the body's thermo-regulatory response mechanisms. The main hazards are hypothermia associated with a fall in the body's core temperature and/or tissue damage that falls under the broad headings of freezing cold injury (FCI) and non-freezing cold injury. Personnel are educated on the dangers of cold stress.

8.2.2 Short and long-term health risks:

The risk for tissue damage is Low, and with preventive medicine measures, the risk of hypothermia is also Low. Confidence in this risk assessment is medium.

9 Noise

9.1 Continuous:

9.1.1 Summary of exposures

The flightline area is classified as a hazardous noise area when aircraft and Aerospace Ground Equipment (AGE) is running. Personnel who work routinely around the aircraft engines and the auxiliary power unit (APU) on the C-17 aircraft wear double hearing protection. Other sources of continuous noise would be from shop equipment, generators, and certain motor vehicles and forklifts. Most hazardous noise equipment is properly marked with the appropriate warning. Workplace surveillance reports identify the proper hearing protection required for the hazardous noise equipment and have evaluated the hearing protection devices available offer adequate protection. Site-specific workplace surveillance data is available in DOEHRS and/or the OEHS Data Portal.

9.1.2 Short and long-term health risks:

Low for the majority of personnel on this site, Moderate for individuals working in some shops and on or near the flight line without proper hearing protection. Confidence in this risk assessment is medium.

9.2 Impulse:

9.2.1 Summary of exposure

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

9.2.2 Short and Long-term health risks:

Low. Confidence in this risk assessment is medium.

10 Other Unique Occupational Hazards

10.1 Fuel/petroleum products/industrial chemical spills

10.1.1 Summary of exposures

No significant incidents have been documented at AAMAB regarding fuel, petroleum or industrial chemical spills. Small POL spills occur throughout the installation from aviation fuel, diesel fuel, and hydraulic fluid.

10.1.2 Short and long-term risks:

Not evaluated. No information available.

10.2 Waste Sites/Waste Disposal:

There is no specific information available to assess this hazard.

10.3 Asbestos:

There is no specific information available to assess this hazard.

10.4 Lead Based Paint:

There is no specific information available to assess this hazard.

10.5 Pesticides/Pest Control:

There is no specific information available to assess this hazard.

11 References²

1. Casarett and Doull's Toxicology: the Basic Science of Exposures, Chapter 2- Principles of Toxicology; Fifth Edition, McGraw Hill, New York.
2. Defense Occupational and Environmental Health Readiness System (referred to as the DOEHRSEH database) at <https://doehrs-ih.csd.disa.mil/Doehrs/>. Department of Defense (DoD) Instruction 6490.03, *Deployment Health*, 2006.
3. DoDI 6055.05, Occupational and Environmental Health, 2008.
4. DoD OEHS Data Portal: <https://doehsportal.apgea.army.mil/doehrs-oehs/> . Some of the data and reports used may be classified or otherwise have some restricted distribution.
5. JCSM (MCM) 0028-07, Procedures for Deployment Health Surveillance, 2007.
6. National Center for Medical Intelligence (NCMI) is at <https://www.intelink.gov/ncmi/index.php>
7. Occupational and Environmental Health Site Assessment (OEHSA), original dated 6 May 05, Updated 8 Jan 07.
8. USA PHC TG230, June 2010 Revision, Version 13
9. USACHPPM 2008 Particulate Matter Factsheet; 64-009-0708, 2008
10. Hemorrhagic Fever With Renal Syndrome Fact Sheet, Centers for Disease Control and Prevention

² NOTE. The data are currently assessed using the most current version of TG230 2010. The general method involves an initial review of the data which eliminates all chemical substances not detected above 1-yr negligible MEG. 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 and water (soil is only evaluated for long term risk). This is performed by deriving separate short-term and long-term population exposure level 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 non-drinking 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).

U.S. Army Public Health Command (USAPHC) (provisional)
Phone: (800) 222-9698. <http://chppm-www.apgea.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/afri/711hpw/usafsam.asp>

DoD Force Health Protection and Readiness (FHP & R)
Phone: (800) 497-6261. <http://fhp.osd.mil>