

Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Ali Al Salem Air Base (AASAB)
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 AASAB. 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: AASAB is located approximately 45 kilometers (km) west of Kuwait City. The installation is the primary training center for the Kuwaiti Air Force. The three major tenants are the Air Force's 386 Air Expeditionary Wing (386 AEW) operating out of the "Rock" and the "Quarry," the Navy's Construction Battalion (SeaBees) operating out of Camp Moreell (also written as Camp Morell in some documents), and the Army's Theater Gateway operating out of the Life Support Area (LSA).

SUMMARY: Summarized below are the key health risks 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 AASAB (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 AASAB:

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 (cutaneous/visceral leishmaniasis, sandfly fever, typhus-fleaborn, west Nile fever, sindbis, leptospirosis, Tuberculosis (TB), meningococcal meningitis, rabies, Q fever, H5N1 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 fever, diarrhea-protozoal). The health effects of these diseases can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A, typhoid fever, hepatitis E). Risks from food/waterborne diseases should be reduced with preventive medicine controls and mitigation, which includes hepatitis A and typhoid fever 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 (cutaneous leishmaniasis, sandfly fever, typhus-fleaborn, west Nile fever, sindbis), 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, H5N1 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 AASAB. 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)).

POEMS

Table 1. Population-Based Health Risk Estimates - AASAB, Kuwait^{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-High, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).	Limiting strenuous physical activities when air quality is especially poor; and actions such as closing tent flaps, windows, and doors.	Short-term: Low-High, Daily levels varied, acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects were possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).
	Long-term: No health guidelines		Long-term: No health guidelines
PM _{2.5}	Short-term: Low-High, 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-High, 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		Short-term: None Identified
	Long-term: None Identified		Long-term: None Identified
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	Potable water used from approved sources	Short-term: None Identified
	Long-term: None Identified		Long-term: None Identified
Water used for other purposes	Short-Term: None Identified		Short-term: None Identified
	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	Preventive measures included Hepatitis A and Typhoid fever vaccination, consumption of food and water used only from approved sources and	Short-term: Low

	health effects could have been temporarily incapacitating to personnel (Diarrhea) or resulted in prolonged illness (Hepatitis A, Typhoid Fever).	routinely monitored. (MOD 11)	
	Long-term: None Identified		Long-term: None Identified
Arthropod Vector Borne	Short-term: Moderate (Leishmaniasis-Cutaneous/Visceral), Low (Sandfly Fever, Typhus-Fleaborn, West Nile Fever, Sindbis).	Preventive measures included proper wear of the treated uniform and application of repellent to exposed skin and appropriate chemoprophylaxis.	Short-term: Low
	Long-term: Low (Leishmaniasis-Visceral infection)		Long-term: Low
Water-Contact (e.g. wading, swimming)	Short-term: Moderate (Leptospirosis)		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 if potentially exposed.	Short-term: Low
	Long-term: None Identified		Long-term: None Identified
Animal Contact	Short-term: Moderate (Q-Fever), Low (Rabies, H5N1 Fever)	CENTCOM General Order 1B mitigates rabies exposure risks by prohibiting contact with, adoption, or feeding of feral animals. Risks are further reduced in the event of assessed contact by prompt post-exposure rabies prophylaxis IAW the CDC's ACIP guidelines.	Short-term: Low
	Long-term: Low (Rabies)		Long-term: No data available
Aerosolized Dust or Soil Contact Disease	Short-term: Moderate (Hantavirus hemorrhagic fever with renal syndrome)	Dust control methods such as wet mopping or wet spray of high traffic areas; and PPE such as respirators.	Short-term: Low
	Long-term: None identified		Long-term: No data available
VENOMOUS ANIMAL/INSECTS	Unmitigated Health Risk Estimate⁴	Control Measures Implemented	Residual Health Risk Estimate⁴
Snakes, Scorpions, Snails	Short-term: Low to High	Risks reduced by education, avoiding contact, and proper and timely reporting and treatment.	Short-term: Low
	Long-term: None Identified		Long-term: None Identified
HEAT/COLD STRESS	Unmitigated Health Risk Estimate⁴	Control Measures Implemented	Residual Health Risk Estimate⁴
Heat	Short-term: High	Risks from heat stress may have been reduced with preventive medicine controls, work-rest cycles, proper nutrition and hydration, cooling tents.	Short-term: Moderate
	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, proper nutrition and hydration, warming tents,	Short-term: Low
	Long-term: Low		Long-term: Low

		and proper wear of protective clothing.	
NOISE	Unmitigated Health Risk Estimate⁴	Control Measures Implemented	Residual Health Risk Estimate⁴
Continuous (Flightline, equipment)	Short-term: Low	Hearing protection used by personnel in higher risk areas	Short-term: Low
Impulse (Weapon firing)	Long-term: Moderate		Long-term: 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 AASAB. 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 a specific acute or chronic health effects were determined. More detailed descriptions of OEH exposures that were evaluated but determined to pose no health risk are discussed in the following sections of this report.

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

1 Discussion of Health Risks at AASAB, Kuwait by Source

The following sections describe the major source categories of potential health risk that were evaluated at AASAB. 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

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

Environmental surveillance occurred between 2004 and 2012. The summary of results follows.

2.2 Particulate matter, less than 10 micrometers (PM₁₀)

2.2.1 Sample data/Notes:

Exposure Guidelines:

Short-term (24-hour) PM₁₀ (µg/m³): Negligible MEG=250, Marginal MEG=420, Critical MEG=600.

Long-term PM₁₀ MEG (µg/m³): Not Available.

The range of 24-hour PM₁₀ concentrations in 168 samples from May 2004 through November 2008 was 6 to 1700 µg/m³.

2.2.2 Short-term health risks:

Low to High: 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 127/168 (76%) of the sampling days had concentrations below the 24-hour negligible MEG (LOW Risk); 21/168 (13%) of the sampling days were between the 24-hour negligible MEG and the 24-hour marginal MEG (LOW Risk); 6/168 (4%) of the sampling days were between the 24-hour marginal and the 24-hour critical MEG (MODERATE Risk); 14/168 (8%) 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 PM₁₀ due to an inability to clearly link chronic health effects with chronic PM₁₀ 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/m³): 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 279 samples from October 2005 through May 2012 was 2-677 µg/m³.

2.3.2 Short-term risk:

Overall 173/279 (62%) of the sampling days had concentrations below the 24-hour negligible MEG (LOW Risk); 96/279 (34%) of the sampling days were between the 24-hour negligible MEG and the 24-hour marginal MEG (LOW Risk); 7/279 (3%) of the sampling days were between the 24-hour marginal and the 24-hour critical MEG (MODERATE Risk); 3/279 (1%) of the sampling days were greater than the critical MEG (HIGH risk). Confidence in the short-term PM₁₀ health risk assessment was low (TG 230, Table 3-6)

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 2005-2012.

2.3.3 Long-term health risks:

Overall 16/279 (6%) had concentrations below the negligible long term 1-year MEG; 157/279 (56%) had concentrations between the negligible and marginal MEG; 106/279 (38%) of the sampling days had concentrations above the marginal MEG. Review of yearly averages indicates concentrations above the marginal MEG with no significant variability.

Moderate: The long-term PM_{2.5} health risk assessment for AASAB 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 AASAB 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 PM₁₀

2.4.1 Sample data/Notes:

Exposure Guidelines:

The health risk assessment was based on average and peak concentration of 155 PM₁₀ airborne metal samples collected at AASAB from May 2004 – November 2008, and the likelihood of exposure. There

were no sample results available before 2004. Risks are determined based on comparison to available MEGs.

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. Three contaminants have detection limits greater than the MEG (Beryllium, Cadmium, and Vanadium). Since these contaminants weren't detected in any of the samples and 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 Sample data/Notes:

The health risk assessment was based on average and peak concentration of 18 valid volatile organic chemical (VOC) air samples collected at AASAB from May 2004, November 2008, 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 14 valid surface soil samples were collected from AASAB from May 2004 – May 2006 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. No parameters exceeded 1-year Negligible MEGs.

4 Water

In order to assess the health risk to US personnel from exposure to water in theater, the US Army Public Health Command (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 primary source of drinking water for all deployed personnel in Kuwait. 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 AASAB 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 the access and travel restrictions.

4.1 Drinking Water: Bottled

4.1.1 Site-Specific Sources Identified

The distributors and all brands of bottled water utilized on AASAB are approved by the USAPHC. Each shipment of bottled water purchased for AASAB is tested by Bioenvironmental Engineering upon receipt IAW AFMAN 48-138. The monitoring includes total coliform presence/absence and *E. coli* for 4 bottles per lot. In addition, one random bottle of water is tested monthly for evidence of chemical agent contamination using the M-272 kit. 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. The monitoring includes total coliform presence/absence and *E. coli*.

4.1.2 Sample data/Notes:

One sample was collected in July 2007. All analytes were not detected at levels above the short or long term MEGs. Routine monitoring results are within acceptable limits. Records of these measurements are available in DOEHS.

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

Non-potable water distribution for Camp Moreell and LSA is trucked in from Camp Arifjan. The water trucks fill the water tanks on a daily basis. Routine field testing of tap water is conducted monthly by the environmental division of CSA contracting company and the FDPDU. Monitoring includes total coliform presence/absence and *E. coli*.

The water for the rest of the base is provided by a desalination plant in Doha that is fed to a cistern and four tanks on the Kuwaiti side of the base through a pumping station in Jahra. There is one line from the cistern that feeds the "Rock" where the water is chlorinated and then distributed on the "Rock." This system is also looped back to the "Quarry" where it is also connected to the water provided to the Kuwaiti side of the base. Routine testing of tap water is conducted monthly on the "Rock" and Quarry" by 386 EMDG/SGPB. 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 *TB Med 577*. All Results are loaded in DOEHS DoD Surveillance program office.

While the water provided in the distribution systems meets *TB Med 577* for water potability, the systems are classified as non-potable due to lack of backflow prevention devices and the risk of infiltration to the

aging system. The system can be used for brushing teeth, washing clothes, washing dishes, and taking showers.

Water must meet potable water standards per *TB Med 577*. Routine field tests conducted by 386 EMDG/SGPB and FDPDU include bacteriological, pH, free available chlorine (FAC) and other sanitation surveillance parameters per *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:

14 samples collected from 2004 - 2012 were evaluated for this health risk assessment.

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

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: All sample analytes were below the short and long-term Negligible MEGs.

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons

No specific hazard sources were documented in Defense Occupational and Environmental Health Readiness System (DOEHRS), or the Military Exposure Surveillance Library (MESL) data portal between May 2004 and September 2012.

5.2 Depleted Uranium (DU)

DU munitions are not stored or worked on at AASAB. The only source of DU at AASAB is the counterweight of the tail in the C-130 aircraft. There is no evidence of exposure to AASAB personnel.

5.3 Ionizing Radiation

5.3.1 Industrial Radiography

Medical and Dental radiography are utilized in the EMEDS Clinic (Dental radiography ended Oct 2012). The radiology technician is the only individual enrolled in the thermoluminescent dosimetry (TLD) program, with no exposures recorded. Industrial radiography is utilized in the Contingency Aeromedical Staging Facility (CASF) for the anti-hijacking screening process, by explosive ordnance disposal (EOD)

for inspections, CE emergency management, and at the personnel search area at the Marauder Gate. Thirty-day TLD studies were performed throughout the EMDG buildings and at the base ECP. The results of these two studies showed a deep dose of 0 mrem, indicate exposures are well below the general population authorized dose of 100 mrem per year. Permitted radioactive materials and generally licensed devices are used in CBRNE detection equipment. Semi-annually radioactive material leak tests were conducted on ESFS generally licensed RAM and were all <2.8 pCi, indicating no leakage above the limit for generally licensed devices (0.005 microcurie, 10 CFR 31.5).

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 medium.

5.4 Non-Ionizing Radiation

5.4.1 Lasers:

The C-17 aircraft has a LAIRCM with a Nominal Optical Hazard Distance (NOHD) of 200 ft (61 meters). 387 EFS personnel may have the AN/PEQ-2A which has a NOHD up to 863 ft (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 SF600 and placed in their medical record.

5.4.2 Radio Frequency (RF) 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 386 EMDG/SGPB 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 Disease¹

All information was taken directly from the National Center for Medical Intelligence (NCMI) (<https://www.intelink.gov/ncmi>). 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. USCENCOM MOD 11 (Reference 12 of this document) lists deployment requirements, to include immunization and chemoprophylaxis, in

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.

effect during the time frame covered by this POEMS. Different MODs have existed over the timeframe covered by this POEMS but, only slight variations to the immunization policies for this region have been made. Most notably are the changes to the anthrax and smallpox policies.

6.1 Foodborne and Waterborne Diseases

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

6.1.1 Diarrheal Diseases (Bacteriological)

Unmitigated High - Mitigated Low: 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 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 did 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, typhoid fever / paratyphoid fever 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 and Typhoid fever). 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 June to September), ecological conditions in rural and periurban areas support arthropod vectors, including mosquitoes, ticks, and sandflies, with variable rates of disease transmission. Because 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. 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 Leishmaniasis – Cutaneous/Visceral

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

6.2.2 Sandfly Fever

Low: Sandfly fever had a low health risk, and transmission generally was limited to the warmer months. The disease is transmitted by sandflies, which typically bite at night and breed in dark places rich in organic matter, particularly in rodent or other animal burrows. Other suitable habitats include leaf litter, rubble, loose earth, caves, and rock holes. Sandflies may be common in peridomestic settings.

Abandoned dwellings, sometimes used by troops as temporary quarters, also can harbor significant numbers of sandflies. Stables and poultry pens in peridomestic areas also may harbor sandflies. Although data were insufficient to assess potential disease rates, 1 to 10 percent of personnel could have been affected per month under worst case conditions. In small groups, exposed to heavily infected sandfly populations in focal areas, attack rates could have been very high (over 50 percent). Incidents can result in debilitating febrile illness typically requiring 1 to 7 days of supportive care followed by return to duty.

6.2.3 Typhus-Fleaborn

Low: The disease is transmitted by fleas, usually on rats. While rat fleas are the most common vectors, cat fleas and mouse fleas are less common modes of transmission. These fleas are not affected by the infection. Human infection occurs because of flea-fecal contamination of the bites on human skin.

6.2.4 West Nile Fever

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

6.2.5 Sindbis (and Sindbis-like virus)

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

6.2.6 Short and long-term health risks:

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

6.3 Water Contact Diseases

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

6.3.1 Leptospirosis

Unmitigated Moderate – Mitigated Low: Leptospirosis 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-term health risks:

Low: 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 occurred 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

Unmitigated Moderate – Mitigated Low: 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 H5N1 avian influenza

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

6.5.4 Short-term health risks:

Unmitigated Variable – Mitigated Low: Low for rabies and H5N1, Moderate for Q-fever. Confidence in the health risk estimate was Medium.

6.5.5 Long-term health risks:

Low: The long term risk for rabies was Low.

6.6 Aerosolized Dust or Soil Contact Disease

6.6.1 Hantavirus hemorrhagic fever with renal syndrome (HFRS)

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

6.6.2 Short term health risks

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

6.6.3 Long-term health risks:

None identified based on available data.

7 Venomous Animal/Insect

All information was taken directly from the Clinical Toxinology Resources web site (<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 Kuwait and may have presented a health risk if they were encountered by personnel. Personnel at AASAB experience minimal sightings or contact.

7.1 Scorpions

- *Androctonus crassicauda* (Black Scorpion), *Leiurus quinquestriatus* (Death Stalker):: Severe envenoming possible, potentially lethal. Cardiotoxicity may be direct or indirect, but is a feature of severe envenoming, with cardiac arrhythmias, cardiac failure.
- *Apistobuthus pterygocercus*, *Buthacus lepochelys*, *Compsobuthus arabicus*, *Compsobuthus pallidus*, *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 schistose* (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 sochureki* (Sochurek's Saw-scaled Viper), *Macrovipera lebetina* (Blunt-nosed Viper): Severe envenoming possible, potentially lethal.

7.3 Snails

- *Conus Textile* (snails): Serious & painful envenomations (sometimes fatal) usually occur when swimmers (waders) pick up shells with live snails still inside

7.4 Short-term health risk:

Unmitigated High – Mitigated Low: 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

Kuwait's climate is subtropical desert climate with two distinct seasons. Summer is May through October, and winter is November through April. During the summer months frequent sand storms are caused by arid shamal winds which blow across the Persian Gulf. Winter brings all of Kuwait's annual precipitation (0.2-1 inch), which is sometimes heavy enough to produce minor local flooding.

8.1 Heat

The health risk of heat stress/injury based on temperatures alone is Low (< 78 °F) in November - March, High (82-87.9°F) in April and extremely high (≥ 88°F) from May – 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 and work/rest cycles.

8.1.1 Short-term health risk:

Unmitigated Variable – Mitigated Low: High health risk of heat injury in unacclimatized personnel from April to October, and Low from November to March. 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 AASAB 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:

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 from weapons qualification training at the Udairi Range. Disposable earplugs are available for use. Additionally, some personnel have the combat earplug.

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: 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 DOEHS 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:

Four sources of waste exist on base, medical, non-hazardous solid waste, hazardous industrial waste, and sanitary sewer/latrines waste. Base personnel have minimal contact with this waste and risk to any exposure is low. Hazardous medical waste (red-bagged) generated by the medical group is staged in an outdoor locked connex that is controlled by medical staff. The medical waste is delivered by medical technicians every-other week to camp Arifjan for incineration.

Non-hazardous solid waste generated by base residents is disposed of in various trash bins throughout the base. The trash bins are emptied through a host nation contractor. Office trash is collected and disposed of by the base janitorial contract personnel.

Currently, proper handling, storage, and disposal of industrial waste generated on base are coordinated at the unit level. Waste is turned in to the central short term storage hazardous material/waste satellite storage site which is managed by the base environmental coordinator (contract personnel). The waste is removed by host nation contract personnel.

The sanitary sewer is a plumbed system from all buildings on base. The sewage drains to a low-point holding tank. This tank is pumped out at least daily by contract personnel and is transported to the base sewage lagoon, commonly referred to as "The Green Mile". No U.S. personnel come into contact with the sewage or the lagoon. Chemical latrines are pumped out by trucks and waste is disposed off base by contract personnel. No specific health risks associated with these waste management operations have been identified.

10.2.2 Short and Long-Term Health Risks: **Low**

10.3 Fuel/petroleum products/industrial chemical spills:

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

Numerous small POL spills occur throughout the installation from aviation fuel, diesel fuel, and hydraulic fluid. No direct exposure to skin has occurred. Direct reading instruments had petroleum hydrocarbon readings below 20ppm. This primarily impacts the Fuels Management Flight (386 ELRS/LGRF) personnel who may be impacted in the performance of their duties and Fire & Emergency Services (386 ECES/CEF) personnel who may be impacted while responding to contain spills and mitigate soil contamination.

10.4 Pesticides/Pest Control:

Much of the pest control at this site consists of trapping and small area treatment for ants, spiders, rodents, and beetles with baits, glue boxes, and pyrethroids. Larvicides (i.e., Agnique and/or Altosid Briquettes) are used for mosquito larval control. Some limited area residual pest control is performed to control mosquitoes. Personnel may have been incidentally exposed to very low levels of pesticide during pest control operations. Occasionally pest management will use PT565 aerosol for treatment of ants, but the primary control is bait stations.

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

There is no specific information available to assess this hazard.

10.7 Security Forces Training Area:

Six soil samples were collected in December 2008 in a new Security Forces training area. These samples are not applicable to the general population. Samples were analyzed for metals/inorganics as well as organics. All contaminants were below the MEGs.

10.7.1 Short -Term Health Risk: Currently sampling data for soil is not evaluated in an acute risk assessment.

10.7.2 Long-Term Health Risk: All contaminants measured at concentrations below MEGs. Confidence in this assessment is medium.

11 References²

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.
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>