Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Camp As Sayliyah, Qatar
(2003 to 2015)

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) 0017-12 (References 1-3).

PURPOSE: This POEMS documents the Department of Defense (DoD) assessment of occupational and environmental health (OEH) risk for Camp As Sayliyah (CAS). It presents a qualitative summary of OEH risks identified at this location and their potential medical implications. The report is based on information collected from 01 January 2003 through 31 December 2015 to include deployment OEH surveillance sampling and monitoring data (e.g., air, water, and soil), field investigation and health assessment reports, as well as country and area-specific information on endemic diseases.

This assessment assumes that environmental sampling at CAS during this period was performed at representative exposure points selected to characterize health risks at the *population–level*. Due to the nature of environmental sampling, the data used to base this report on may not be fully representative of all the fluctuations in environmental quality or capture unique occurrences. While one might expect health risks pertaining to historic or future conditions at this site to be similar to those described in this report, the health risk assessment is limited to 01 January 2003 through 31 December 2015.

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

SITE DESCRIPTION:

Qatar is a peninsula that has a mostly flat, barren, stony, and sandy terrain with a hot desert climate. There are no rivers or streams in the country. Camp As Sayliyah is located near Doha, Qatar in an urban desert environment. The camp is surrounded by desert, mixed residential and industrial areas. There is a gravel industrial compound located approximately 10 kilometers (km) south of the camp, no additional information was provided about the industrial compound. All of the structures at CAS are permanent structures or covered canopies and all the structures have been built within the past 10 years. The soil is arid desert dirt, rock and sand soil types containing large amounts of calcite, quartz, and feldspar and lesser amounts of chlorite and clay minerals, with small amounts of hornblende and ilmenite with hardly any vegetation (Reference 12 and 15). All of the major roads at CAS were paved with only a few back paths that were gravel/dirt roads (Reference 12).

SUMMARY: Conditions that may pose a Moderate or greater health risk are summarized in Table 1. Table 2 provides population based risk estimates for identified OEH conditions at Camp As Sayliyah. As indicated in the detailed sections that follow Table 2, controls established to reduce health risk were factored into this assessment. In some cases, e.g., ambient air, specific controls are noted, but not routinely available/feasible.

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

Short-term health risks & medical implications:

The following hazards may be associated with potential acute health effects in some personnel during deployment at Camp As Sayliyah:

Inhalable coarse particulate matter less than 10 micrometers in diameter (PM_{10}) from environmental dust; food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, typhoid/paratyphoid fever, diarrhea-protozoal); other endemic diseases (Crimean-Congo hemorrhagic fever, leptospirosis, Tuberculosis (TB), Q fever); and heat stress. For food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, typhoid/paratyphoid fever, diarrhea-protozoal), if ingesting local food and water, the health effects can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A, typhoid/paratyphoid fever). Risks from food/waterborne diseases may have been reduced with preventive medicine controls and mitigation, which includes hepatitis A and typhoid fever vaccinations and only drinking from approved water sources in accordance with standing CENTCOM policy. For other vector-borne endemic diseases (Crimean-Congo hemorrhagic fever), these diseases may constitute a significant risk due to exposure to biting vectors; risk reduced to 'Low' by proper wear of the treated uniform, application of repellent to exposed skin, bed net use, and appropriate chemoprophylaxis, as well as minimizing areas of standing water and other vector-breeding areas. For water contact diseases (leptospirosis) activities involving extensive contact with surface water increase risk. For respiratory diseases (TB), personnel in close-quarter conditions could have been at risk for person-to-person spread. Animal contact diseases (Q fever), pose year-round risk. For heat stress, risk can be greater during months of May through September, and greater for susceptible persons including those older than 45, of low fitness level, unacclimatized, or with underlying medical conditions, and those under operational constraints (equipment, PPE, vehicles). Risks from heat stress may have been reduced with preventive medicine controls, work-rest cycles, proper hydration and nutrition, and mitigation.

Air quality: For inhalable coarse particulate matter less than 10 micrometers in diameter (PM_{10}) from environmental dust, the PM_{10} overall short-term risk was 'Low to High.' For inhalable fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) from environmental dust, the $PM_{2.5}$ overall short-term risk was 'none identified based on the available sampling data.' However, the area was a dust-prone urban desert environment, with vehicle traffic and an arid climate. Consequently, exposures to PM_{10} and $PM_{2.5}$ may have varied, as conditions may have varied, and may have resulted 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, particularly exposures to high levels of dust such as during high winds or dust storms. For PM_{10} and $PM_{2.5}$, 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 short-term health 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 while at Camp As Sayliyah, Qatar, and vicinity. Personnel who reported with symptoms or required treatment while at this site should have exposure and treatment noted in medical record (e.g., electronic medical record and/or on a Standard Form (SF) 600 (*Chronological Record of Medical Care*).

Long-term health risks & medical implications:

The following hazards may be associated with potential chronic health effects in some personnel during deployment at Camp As Sayliyah:

For continuous noise exposure, the long-term risk was 'Low to Moderate'; risk may have been reduced by appropriate hearing protection used by personnel in higher risk areas (around sources of continuous noise such as generators and power production).

Air quality: For inhalable fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) from environmental dust, the overall long-term risk was 'Low.' Inhalable coarse particulate matter less than 10 micrometers in diameter (PM_{10}) from environmental dust was not evaluated for long-term risk due to no health guidelines. However, the area was a dust-prone urban desert environment, with vehicle traffic and an arid climate, and conditions may have varied. For inhalational exposure to high levels of dust containing PM_{10} and $PM_{2.5}$ from high winds or dust storms, it is considered possible that some otherwise healthy personnel, who were exposed for a long-term period to dust and particulate matter, could develop certain health conditions (e.g., reduced lung function, cardiopulmonary disease). Personnel with a history of asthma or cardiopulmonary disease could potentially be more likely to develop such chronic health conditions. While the dust and particulate matter exposures and exposures to burn pits are acknowledged, at this time there were no specific recommended, post-deployment medical surveillance evaluations or treatments. Providers should still consider overall individual health status (e.g., any underlying conditions/susceptibilities) and any potential unique individual exposures (such as burn pits/barrels, incinerators, occupational or specific personal dosimeter data) when assessing individual concerns. Certain individuals may 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).

Table 2. Population-Based Health Risk Estimates – Camp As Sayliyah [1, 2]

Source of Identified Health Risk[3]	Unmitigated Health Risk Estimate[4]	Control Measures Implemented	Residual Health Risk Estimate[4]
AIR			
Particulate matter less than 10 micrometers in diameter (PM_{10})	Short-term: Low to High, Daily levels vary acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. Effects that are more serious are 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 to High, Daily levels vary acute health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. Effects that are more serious are possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).
	Long-term: No health guidelines		Long-term: No health guidelines
Particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$)	Short-term: Not an identified source of health risk. A majority of the time mild acute (short term) health effects are anticipated; certain peak levels may produce mild eye, nose, or throat irritation in some personnel and pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.	Limiting strenuous physical activities when air quality is especially poor; and actions such as closing tent flaps, windows, and doors.	Short-term: Not an identified source of health risk. A majority of the time mild acute (short term) health effects are anticipated; certain peak levels may produce mild eye, nose, or throat irritation in some personnel and pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.
	Long-term: Low. A small percentage of personnel may be at increased risk for developing chronic conditions. Particularly those more susceptible to acute effects (e.g., those with asthma/existing respiratory diseases).		Long-term: Low. A small percentage of personnel may be at increased risk for developing chronic conditions. Particularly those more susceptible to acute effects (e.g., those with asthma/existing respiratory diseases).
ENDEMIC DISEASE			
Food borne/Waterborne (e.g., diarrhea-bacteriological)	Short-term: Variable; High (bacterial diarrhea) to Moderate (diarrhea-protozoal, hepatitis A, typhoid/paratyphoid fever) to Low (brucellosis, hepatitis E) if ingesting local food/water, the health effects can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (hepatitis A, typhoid fever, hepatitis E, brucellosis).	Preventive measures include Hepatitis A and typhoid fever vaccination and consumption of food and water only from approved sources.	Short-term: Low to none
	Long-term: none identified		Long-term: No data available
Arthropod Vector Borne	Short-term: Variable; Moderate for Crimean-Congo hemorrhagic fever; and Low for, leishmaniasis - cutaneous (acute), sand fly fever, typhus-murine, rickettsioses, tickborne, and West Nile fever.	Preventive measures include proper wear of treated uniform, application of repellent to exposed skin, bed net use, minimizing areas of standing water and appropriate chemoprophylaxis.	Short-term: Low
	Long-term: Low for Leishmaniasis-visceral infection.		Long-term: No data available
Water-Contact (e.g., wading, swimming)	Short-term: Moderate for leptospirosis		Short-term: Low for leptospirosis.
	Long-term: No data available		Long-term: No data available
Respiratory	Short-term: Variable; Moderate for tuberculosis (TB) to Low for meningococcal meningitis.	Providing adequate living and workspace; medical screening; vaccination.	Short-term: Low
	Long-term: No data available		Long-term: No data available
Animal Contact	Short-term: Variable; Moderate for Q-fever to Low for rabies.	Prohibiting contact with, adoption, or feeding of feral animals IAW U.S.	Short-term: No data available
	Long-term: Low (Rabies)		Long-term: No data available

Source of Identified Health Risk[3]	Unmitigated Health Risk Estimate[4]	Control Measures Implemented	Residual Health Risk Estimate[4]
		Central Command (CENTCOM) General Order (GO) 1C. Risks are further reduced in the event of assessed contact by prompt post-exposure rabies prophylaxis IAW The Center for Disease Control's (CDC) Advisory Committee on Immunization Practices guidance.	
VENOMOUS ANIMAL/ INSECTS			
Snakes, scorpions, and spiders	Short-term: Low; If encountered, effects of venom vary with species from mild localized swelling to potentially lethal effects	Risk reduced by avoiding contact, proper wear of uniform (especially footwear), and proper and timely treatment.	Short-term: Low; If encountered, effects of venom vary with species from mild localized swelling to potentially lethal effects
	Long-term: No data available		Long-term: No data available
HEAT/COLD STRESS			
Heat	Short-term: Variable; Risk of heat injury is High for May-September, and Low to moderate for all other months.	Work-rest cycles, proper hydration and nutrition, and Wet Bulb Globe Temperature (WBGT) monitoring.	Short-term: Variable. Risk of heat injury in unacclimatized or susceptible personnel is Moderate for May-September and Low for all others.
	Long-term: Low, The long-term risk was Low. However, the 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.		Long-term: Low, The long-term risk is Low. However, the 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.
Cold	Short-term: Low risk of cold stress/injury.	Risks from cold stress reduced with protective measures such as use of the buddy system, limiting exposure during cold weather, proper hydration and nutrition, and proper wear of issued protective clothing.	Short-term: Low risk of cold stress/injury.
	Long-term: Low; Long-term health implications from cold injuries are rare but can occur, especially from more serious injuries such as frostbite.		Long-term: Low; Long-term health implications from cold injuries are rare but can occur, especially from more serious injuries such as frostbite.
NOISE			
Continuous (Flight line, Power Production)	Short-term: Low	Hearing protection used by personnel in higher risk areas	Short-term: Low
	Long-term: Low to Moderate		Long-term: Low

Source of Identified Health Risk[3]	Unmitigated Health Risk Estimate[4]	Control Measures Implemented	Residual Health Risk Estimate[4]

[1]This Summary Table provides a qualitative estimate of population-based short- and long-term health risks associated with the occupational environment conditions at Camp As Sayliyah. It does not represent an 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 result in a significant individual exposure. Any such person seeking medical care should have their specific exposure documented in an SF600.

[2] This assessment is based on specific environmental sampling data and reports obtained from 1 January 2003 through 31 December 2015. Sampling locations are assumed to be representative of exposure points for the camp population but may not reflect all the fluctuations in environmental quality or capture unique exposure incidents.

[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 Camp As Sayliyah. The health risks are presented as Low, Moderate, High, or Extremely High for both acute and chronic health effects. The health 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 Army Public Health Center (Provisional) [APHC (PROV)]. Where applicable, "None Identified" is used when though a potential exposure is identified, and no health risks of either a specific acute or chronic health effects are determined. More detailed descriptions of OEH exposures that are evaluated but determined to pose no health risk are discussed in the following sections of this report.

[4]Health risks in this Summary Table are 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 Camp As Sayliyah, Qatar by Source

The following sections provide additional information about the OEH conditions summarized above. All risk assessments were performed using the methodology described in the U.S. Army Public Health Command (USAPHC) Technical Guide 230, *Environmental Health Risk Assessment, and Chemical Exposure Guidelines for Deployed Military Personnel* (Reference 4). All OEH risk estimates represent residual risk after accounting for preventive controls in place. Occupational exposures and exposures to endemic diseases are greatly reduced by preventive measures. For environmental exposures related to airborne dust, there are limited preventive measures available, and available measures have little efficacy in reducing exposure to ambient conditions.

2 Air

2.1 Site-Specific Sources Identified

Camp As Sayliyah is 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 result 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) are at greatest risk of developing notable health effects.

2.2 Particulate matter

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

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

2.3.1 Exposure Guidelines:

Short Term (24-hour) PM_{10} (micrograms per cubic meter, $\mu g/m^3$):

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

Long-term PM_{10} MEG ($\mu g/m^3$):

- Not defined and not available.

2.3.2 Sample data/Notes:

A total of 84 valid PM_{10} air samples were collected from 2003 – 2005 at Camp As Sayliyah. There were 39 samples taken in 2003, 11 samples taken in 2004 and 34 samples taken in 2005. There were no PM_{10} samples available from 2006- 2015. The range of 24-hour PM_{10} concentrations was 19 $\mu g/m^3$ – 671 $\mu g/m^3$ with an average concentration of 150 $\mu g/m^3$ and the standard error of the average is 21. The 95% UCL for PM_{10} samples calculated using the USEPA's ProUCL software, was 172 $\mu g/m^3$.

2.3.3 Short-term health risks:

Low to High: The short-term PM_{10} health risk assessment is Low to High based on average and peak PM_{10} sample concentrations, and the likelihood of exposure at these hazard severity levels. A High health risk assessment is expected to have significantly degraded mission capabilities by lowering the execution standard, preventing completion of essential tasks, and jeopardizing mission completion if hazards arise during the mission. It is anticipated that some in-theater medical countermeasures and resources will occur (Reference 4, Table 3-2). The daily average risk levels for PM_{10} show no hazard for 82%, low health risk for 16%, moderate health risk for 0%, and high health risk for 2% of the time. Confidence in the short-term PM_{10} health risk assessment is low (Reference 4, Table 3-6).

The hazard severity for average PM_{10} concentrations in samples was negligible. The results predict a few personnel may have experienced notable mild eye, nose, or throat irritation; most personnel would have experience only mild effects. Service members with pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may have experienced an exacerbation of their conditions (Reference 4, Table 3-11).

For the highest observed PM_{10} sample concentration, the hazard severity ranged from negligible to critical. During peak exposures at the critical hazard severity level (above 600 $\mu g/m^3$), the results predict that most, if not all, personnel would have experienced very notable eye, nose, and throat irritation and respiratory effects. Visual acuity would have been impaired, as is overall aerobic capacity. Some personnel would not have been able to perform their assigned duties. Some lost-duty days expected. Those with a history of asthma or cardiopulmonary disease would have experienced more severe symptoms (Reference 4, Table 3-11).

2.3.4 Long-term health risk:

Not Evaluated-no available health guidelines. The U.S. Environmental Protection Agency (EPA) has retracted its long-term standard (National Ambient Air Quality Standards, NAAQS) for PM_{10} due to an inability to make a clear link between chronic health effects and chronic PM_{10} exposure levels.

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

2.4.1 Exposure Guidelines:

Short Term (24-hour) $PM_{2.5}$ ($\mu g/m^3$):

- Negligible MEG = 65
- Marginal MEG = 250
- Critical MEG = 500

Long-term (1year) $PM_{2.5}$ MEGs ($\mu g/m^3$):

- Negligible MEG = 15
- Marginal MEG = 65.

2.4.2 Sample data/Notes:

No samples were available at CAS for the years 2003, 2004, 2006-2013. A total of 20 valid $PM_{2.5}$ air samples were collected in 2005, 2014 and 2015, 15 samples were taken in 2005, two samples were taken in 2014 and three samples were taken in 2015. The range of 24-hour $PM_{2.5}$ concentrations was seven $\mu g/m^3$ – 64 $\mu g/m^3$ with an average concentration of 34$\mu g/m^3$ and the standard error of the average is six. The 95% UCL for $PM_{2.5}$ samples calculated using the USEPA's ProUCL software, was 40 $\mu g/m^3$.

2.4.3 Short-term health risks:

None identified based on the available sampling data.
All samples were below the short term, 24 hour negligible MEG (65 µg/m^3). Daily average health risk levels for $PM_{2.5}$ show no hazard for 100% of the time. Confidence in the short-term $PM_{2.5}$ health risk assessment was low (Reference 4, Table 3-6).

2.4.4 Long-term health risks:

Low: The long-term health risk assessment is Low based on average $PM_{2.5}$ concentration, and the likelihood of exposure at this hazard severity level. A Low health risk level suggests that long-term exposure to $PM_{2.5}$ is not expected to have any specific medical action needed (Reference 4, Table 3-3). Confidence in the long-term $PM_{2.5}$ health risk assessment is low (Reference 4, Table 3-6).

The hazard severity was negligible for average $PM_{2.5}$ sample concentrations. The results suggest that with repeated exposures above the negligible hazard severity threshold, it is considered possible that a small percentage of personnel may have increased risk for developing chronic conditions, such as reduced lung function or exacerbated chronic bronchitis, COPD, asthma, atherosclerosis, or other cardiopulmonary diseases (Reference 4, Table 3-12).

2.5 Airborne Metals

2.5.1 Sample data/Notes:

A total of 84 valid PM_{10} airborne metal samples were collected at Camp As Sayliyah from 2003-2005. All samples were below their corresponding 1-year negligible MEGs thus no further evaluation is necessary.

There were 20 valid PM2.5 airborne metal samples collected at Camp As Sayliyah from 2005, 2014 and 2015. All samples were below their corresponding 1-year negligible MEGs thus no further evaluation is necessary.

2.5.2 Short-term health risks:

None identified based on the available sampling data.

2.5.3 Long-term health risks:

None identified based on the available sampling data.

2.6 Volatile Organic Compounds (VOC)

2.6.1 There were 14 VOC samples taken at Camp As Sayliyah. However, of these 14 samples, only 11 were valid samples to be used to conduct a health risk assessment. There were not enough samples to perform a risk assessment. All the samples were taken in 2005 and only in 3 months of that particular year. There were 11 VOCs detected in the four samples and all of them were below their respective 1 year negligible MEGs.

2.6.2 Short and long-term health risks:

Not enough data to determine a risk.

3 Soil

3.1 Site-Specific Sources Identified

3.2 Sample data/Notes:

There were only three valid surface soil samples collected at Camp As Sayliyah on 23 July 2003. The primary soil contamination exposure pathways are dermal contact and dust inhalation. Typical parameters analyzed for included semi volatile organic compounds (SVOCs), heavy metals, polychlorinated biphenyls (PCBs), pesticides, and 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). Due to the limited amount of samples available and that all of the samples for each camp were taken on the same day it is not possible to evaluate a health risk. Of the three samples taken, none of the parameters exceeded the 1-year negligible MEGs.

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:

Not enough available sample data to determine a health risk.

4 Water

In order to assess the health risk to U.S. personnel from exposure to water in theater, the APHC identified the most probable exposure pathways. These are based on the administrative information provided on the field data sheets submitted with the samples taken over the period being evaluated. Based on the information provided from the field, all samples for untreated water samples were associated with source water for treatment and no exposure pathways were associated with those samples. Therefore, untreated samples are not assessed as potential health hazards. It is assumed that one hundred percent of all U.S. personnel at Camp As Sayliyah are directly exposed to disinfected fresh bulk water and bottled water since this classification of water is primarily used for personal hygiene, showering, cooking, and for use at vehicle wash racks.

4.1 Drinking Water: Bottled or Packaged Water

4.1.1 Site-Specific Sources Identified

There were three bottled water samples taken at Camp Sayliyah in 2003; however, the brand name of the bottled water is unknown. The 2014 and 2015, OEHSAs indicated that there was one bottled water brand, Rayyon Natural Mineral Water®, used at Camp As Sayliyah. However, there were no bottled water samples available to evaluate except for those taken in 2003 (References 12 and 13). Identification of a trademarked product does not imply endorsement by the Army.

4.1.2 Sample data/Notes:

To assess the potential for adverse health effects to troops, the following assumptions were made about dose and duration: A conservative (protective) assumption was that personnel routinely ingested

5 L/day of bottled water for up to 365 days (1-year). It was further assumed that control measures were not used. Three valid bottled water samples were collected on 23 July 2003. All of the chemicals were below their corresponding 1-year negligible MEGs except for fluoride, which was slightly above its 1-year negligible MEG but its average concentration, was well below the long term MEG.

4.1.3 Short-term and long-term health risk:

Not enough available sample data to determine a health risk.

4.2 Drinking Water: Disinfected fresh and treated water

4.2.1 Site-Specific Sources Identified

Although the primary route of exposure for most microorganisms is ingestion of contaminated water, dermal exposure to some microorganisms, chemicals, and biologicals may also cause adverse health effects. Complete exposure pathways would include 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:

To assess the potential for adverse health effects to troops the following assumptions were made about dose and duration: All U.S. personnel at this location were expected to remain at this site for approximately 1 year. A conservative (protective) assumption is that personnel routinely consumed less than 5L/day of drinking water for up to 365 days (1-year). It is further assumed that control measures and/or personal protective equipment were not used.
Nine disinfected water samples from 2013 to 2015 were evaluated for this health risk assessment. No chemicals were detected at levels above the short or long-term MEGs. There was one treated water sample taken in 2014 that did not have any data associated with it so it was not included in the evaluation.

4.2.3 Short and long-term health risks:

Not enough available sample data to determine a health risk.

4.3 Non-drinking Water: Disinfected and ROWPU treated

4.3.1 Site-Specific Sources Identified

Although the primary route of exposure for most microorganisms is ingestion of contaminated water, dermal exposure to some microorganisms, chemicals, and biologicals may also cause adverse health effects. Complete exposure pathways would include 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.

4.3.2 Sample data/Notes:

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

Seven disinfected water samples taken at Camp As Sayliyah from 2004, 2010, 2011, and 2012 were evaluated for this health risk assessment. There was one sample taken in 2004, three samples taken in 2010, one sample taken in 2011, and two samples taken in 2012. Among these samples, there were 37 detected chemicals; however, no samples had a sample concentration greater than the non-drinking water MEG (2.5 times the 1-year negligible MEG for 5L/day consumption rate).

4.3.3 Short and long-term health risks:

Not enough available sample data to determine a health risk.

4.4 Non-drinking Water: Untreated water

4.4.1 Site-Specific Sources Identified

Although the primary route of exposure for most microorganisms is ingestion of contaminated water, dermal exposure to some microorganisms, chemicals, and biologicals may also cause adverse health effects. Complete exposure pathways would include 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 or recreation.

4.4.2 Sample data/Notes:

Only one untreated water sample was taken at Camp As Sayliyah on 12 November 2010. There is not enough data to determine a health risk; however, this sample did not have any chemicals detected at levels above the short or long-term MEGs.

4.4.3 Short and long-term health risks:

Not enough available sample data to determine a health risk.

5 Military Unique

5.1 Chemical Biological, Radiological Nuclear (CBRN) Weapons

No specific hazard sources were documented in the Defense Occupational and Environmental Health Readiness System (DOEHRS) or the Military Exposure Surveillance Library (MESL) from 01January 2003 through 31 December 2015 timeframe (References 1 and 5).

5.2 Depleted Uranium (DU)

No specific hazard sources were documented in the DOEHRS or MESL from 01January 2003 through 31 December 2015 timeframe (References 1 and 5).

5.3 Ionizing Radiation

The 2015 OEHSA reported there was a Z backscatter van (ZBV) that contained industrial radiography (References 12 and 13). ZBV was only utilized for local contractors entering post and radiation levels under normal operating conditions were extremely low and well within federally accepted levels when operated properly.

5.4 Non-Ionizing Radiation

The 2015 OEHSA indicated that a communication tower located 100 yards from Qatar ASG headquarters had typical communication antennas (References 12 and 13). There was very low emission of non-ionizing radiation to local, US Military, government, and contracted personnel.

6 Endemic Diseases

This document lists the endemic diseases reported in the region, its specific health risks and severity and general health information about the diseases. CENTCOM Modification (MOD) 12 (Reference 6) lists deployment requirements, to include immunizations and chemoprophylaxis, in effect during the timeframe of this POEMS.

6.1 Food borne and Waterborne Diseases

Food borne and waterborne diseases in the area can be transmitted through the consumption of local food and water. Local unapproved food and water sources (including ice) may be 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 does not exist within the country. Only a small fraction of diseases are identified or reported in host nation personnel. Diarrheal diseases are expected to temporarily incapacitate a high percentage of U.S. personnel within days if local food, water, or ice is consumed. Hepatitis A can typically cause prolonged illness in a smaller percentage of unvaccinated personnel. Vaccinations are required for DoD personnel and contractors. In addition, although not specifically assessed in this document, significant outbreaks of viral gastroenteritis (e.g., norovirus) and food poisoning (e.g., *Bacillus cereus*, *Clostridium perfringens*, *Staphylococcus*) may occur. Key disease risks are summarized below:

Mitigation strategies were in place and included consuming food and water from approved sources, vaccinations (when available), frequent hand washing, and general sanitation practices.

6.1.1 Diarrheal diseases (bacterial)

High, mitigated to Low: Diarrheal diseases are expected to temporarily incapacitate a high percentage of personnel (potentially 11-50% 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/paratyphoid fever, and Diarrhea-protozoal

Moderate, mitigated to Low: Unmitigated health risk to U.S. personnel is moderate year round for hepatitis A and typhoid/paratyphoid fever, and diarrhea-protozoal. Hepatitis A, typhoid/paratyphoid fever, and diarrhea-protozoal disease may cause prolonged illness in a small percentage of personnel (less than 1% per month). Mitigation was in place to reduce the risks to low.

6.1.3 Brucellosis and Hepatitis E

Low: Potential health risk to U.S. personnel is Low year round for brucellosis and hepatitis E. Extremely rare cases could occur in personnel exposed to contaminated food or water.

6.1.4 Short-term Health Risks:

Low: The overall unmitigated short-term risk associated with food borne and waterborne diseases are considered High (bacterial diarrhea, hepatitis A, typhoid/paratyphoid fever) to Moderate (diarrhea-cholera, diarrhea-protozoal) to Low (brucellosis, hepatitis E) if local food or water is consumed. Preventive Medicine measures reduced the risk to Low. Confidence in the health risk estimate is high.

6.1.5 Long-term Health Risks:

None identified based on available data.

6.2 Arthropod Vector-Borne Diseases

During the warmer months, the climate and ecological habitat support populations of arthropod vectors, including mosquitoes, ticks, mites, and sandflies. Significant disease transmission is sustained countrywide, including urban areas. Mitigation strategies were in place and included proper wear of treated uniforms, application of repellent to exposed skin, and use of bed nets and chemoprophylaxis (when applicable). Additional methods included the use of pesticides, reduction of pest/breeding habitats, and engineering controls.

6.2.1 Crimean-Congo hemorrhagic fever

Moderate, mitigated to Low: Unmitigated risk is moderate, but reduced to low with mitigation measures. Crimean-Congo hemorrhagic fever occurs in rare cases (less than 0.1% per month attack rate in indigenous personnel) and is transmitted by tick bites or occupational contact with blood or secretions from infected animals. The disease typically requires intensive care with fatality rates from 5% to 50%.

6.2.2 Leishmaniasis

Low: The disease risk is low year round and peaks during the warmer months when sandflies are most prevalent. Leishmaniasis is transmitted by sand flies. 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. There are two forms of the disease; cutaneous (acute form) and visceral (a more latent form of the disease). The leishmaniasis parasites may survive for years in infected individuals and this infection may go unrecognized by physicians in the U.S. when infections become symptomatic years later. Cutaneous infection is unlikely to be debilitating, though lesions may be disfiguring. Visceral leishmaniasis disease can cause severe febrile illness, which typically requires hospitalization with convalescence over 7 days.

6.2.3 Sandfly fever

Low: Sandfly fever has a Low risk; it is assessed, as present, rare cases cannot be ruled out. The disease is transmitted by sandflies and occurs more commonly in children though adults are still at risk. Sandfly fever disease typically resulted in debilitating febrile illness requiring 1 to 7 days of supportive care followed by return to duty.

6.2.4 Typhus-murine (fleaborne)

Low: Potential health risk to U.S. personnel is Low year round. Typhus-murine is caused by Mite-borne typhus is a significant cause of febrile illness in local populations with rural exposures in areas

where the disease is endemic. The disease typically resulted in debilitating febrile illness requiring 1 to 7 days of supportive care followed by return to duty.

6.2.5 Rickettsioses, tickborne (spotted fever group)

Low: Rickettsioses, tickborne (spotted fever group) is present. The disease is transmitted by multiple species of hard ticks. Most human cases are sporadic and outbreaks are rare and if they did occur, they may have been associated with increased tick contact. This disease is associated with a low risk estimate. The disease typically resulted in debilitating febrile illness requiring 1 to 7 days of supportive care followed by return to duty with appropriate treatment; more prolonged and severe infections may occur with rare fatalities.

6.2.6 West Nile fever

Low: West Nile fever is present. The disease is maintained by the bird population and transmitted to humans via mosquito vector. Typically, infections in young, healthy adults were asymptomatic although fever, headache, tiredness, body aches (occasionally with a skin rash on trunk of body), and swollen lymph glands can occurred. This disease is associated with a low risk estimate.

6.2.7 Short -term health risks:

Low: The unmitigated health risk estimate is Moderate for Crimean-Congo hemorrhagic fever; and Low for, leishmaniasis-cutaneous (acute), sandfly fever, typhus-murine (fleaborne), rickettsioses tickborne (spotted fever group) and West Nile fever. Health risk is reduced to low by proper wear of the uniform, application of repellent to exposed skin, and appropriate chemoprophylaxis. Confidence in health risk estimate was high.

6.2.8 Long-term health risks:

Low: The unmitigated risk is low for leishmaniasis-visceral (chronic). Risk is maintained Low by proper wear of the uniform and application of repellent to exposed skin. Confidence in the risk estimate is high.

6.3 Water Contact Diseases

Operations or activities that involve extensive water contact may result 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 are likely to be contaminated with human and animal waste. Activities such as wading or swimming may result in exposures to enteric diseases such as diarrhea and hepatitis via incidental ingestion of water. Prolonged water contact also may lead to the development of a variety of potentially debilitating skin conditions such as bacterial or fungal dermatitis. Mitigation strategies were in place and included avoiding water contact and recreational water activities, proper wear of uniform (especially footwear), and protective coverings for cuts/abraded skin.

6.3.1 Leptospirosis

Moderate, mitigated to Low: Human infections occur year round through exposure to water or soil contaminated by infected animals and is associated with wading, and swimming in contaminated, untreated open water. The occurrence of flooding after heavy rainfall facilitates the spread of the organism because as water saturates the environment *Leptospira* present in the soil passes directly into surface waters. *Leptospira* can enter the body through cut or abraded skin, mucous membranes,

and conjunctivae. Infection may also occur from ingestion of contaminated water. The acute, generalized illness associated with infection may 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. Incidence could result in debilitating febrile illness typically requiring 1 to 7 days of inpatient care, followed by return to duty; some cases may require prolonged convalescence. This disease is associated with a Moderate health risk estimate.

6.3.2 Short-term health risks:

Low: Unmitigated Health risk of leptospirosis is Moderate during warmer months. Mitigation measures reduce the risk to Low. Confidence in the health risk estimate is high.

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 be exposed to a wide variety of common respiratory infections in the local population. These include influenza, pertussis, viral upper respiratory infections, viral and bacterial pneumonia, and others. The U.S. military populations living in close-quarter conditions are at risk for substantial person-to-person spread of respiratory pathogens. Influenza is of particular concern because of its ability to debilitate large numbers of unvaccinated personnel for several days. Mitigation strategies were in place and included routine medical screenings, vaccination, enforcing minimum space allocation in housing units, implementing head-to-toe sleeping in crowded housing units, implementation of proper personal protective equipment (PPE) when necessary for healthcare providers and detention facility personnel.

6.4.1 Tuberculosis (TB)

Moderate, mitigated to Low: Potential health risk to U.S. personnel is Moderate, mitigated to Low, year round. Transmission typically requires close and prolonged contact with an active case of pulmonary or laryngeal TB, although it also can occur with contact that is more incidental. Individuals with prolonged indoor exposure to the local population are at increased risk for latent TB infection.

6.4.2 Meningococcal meningitis

Low: Meningococcal meningitis poses a Low risk and is transmitted from person to person through droplets of respiratory or throat secretions. Close and prolonged contact facilitates the spread of this disease. 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: Moderate (TB) to Low (for meningococcal meningitis). Overall risk was reduced to Low with mitigation measures. Confidence in the health risk estimate is high.

6.4.4 Long-term health risks:

None identified based on available data. Tuberculosis is evaluated as part of the post deployment health assessment (PDHA). A TB skin test is required post-deployment if potentially exposed and is based upon individual service policies.

6.5 Animal-Contact Diseases

6.5.1 Rabies

Low: Rabies posed a year-round low risk. Occurrence in local animals was well above U.S. levels due to the lack of organized control programs. Dogs, cats, and bats are the primary source of human exposure in Qatar. 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. Although the vast majority (>99%) of persons who develop rabies disease will do so within a year after a risk exposure, there have been rare reports of individuals presenting with rabies disease up to six years or more after their last known risk exposure. Mitigation strategies included command emphasis of CENTCOM GO 1C, reduction of animal habitats, active pest management programs, and timely treatment of feral animal scratches/bites.

6.5.2 Q-Fever

Moderate, mitigated to Low: Potential health risk to U.S. personnel is Moderate, but mitigated to Low, year round. 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%) 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. 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. Mitigation measures included consuming approved food sources, proper food preparation, and cooking temperatures, avoidance of animals and farms, dust abatement when working in these areas and proper PPE for personnel working with animals.

6.5.3 Short-term health risks:

Low: The short-term unmitigated risk is Moderate for rabies, and Q-fever. Mitigation measures reduced the overall risk to Low. Confidence in risk estimate is high.

6.5.4 Long-term health risks:

Low: A Low long-term risk exists for rabies because, in rare cases, the incubation period for rabies can be several years.

7 Venomous Animal/Insect

All information was taken directly from the Armed Forces Pest Management Board (Reference 8) and the Clinical Toxinology Resources web site from the University of Adelaide, Australia (Reference 9). The species listed below have home ranges that overlap the location of Camp As Sayliyah, and may present a health risk if they are encountered by personnel. See Section 9 for more information about pesticides and pest control measures.

7.1 Scorpions

- *Androctonus crassicauda (black scorpion)*: Severe envenoming possible and potentially lethal, however most stings cause only severe local pain.

- *Apistobuthus pterygocercus, Buthacus leptochelys*, *Buthacus yotvatensis*, *Compsobuthus arabicus*, *and Orthochirus scrobiculosus*: Clinical effects are unknown. There are a number of dangerous Buthid scorpions, but there are also some known to cause minimal effects only. Without clinical data, it is unclear where this species fits within that spectrum.

- *Scorpio maurus, Scorpio maurus palmatus*: Mild envenoming only, not likely to prove lethal.

- *Leiurur quinquestriatus*: Severe envenoming possible, potentially lethal.

7.2 Snakes

- *Cerastes gasperettii*: Potentially lethal envenoming, though unlikely.

- *Echis coloratus*: severe envenoming possible, potentially lethal

- *Echis sochureki*: *M*oderate to severe, potentially lethal envenoming.

- *Pseudocyclophis persicus*: Clinical effects vary, but unlikely to cause significant envenoming.

7.3 Short-term health risk:

Low: If encountered, effects of venom vary with species from mild localized swelling to potentially lethal effects. See effects of venom above. Mitigation strategies included avoiding contact, proper wear of uniform (especially footwear), and timely medical treatment. Confidence in the health risk estimate is low (Reference 4, Table 3-6).

7.4 Long-term health risk:

None identified.

8 Heat/Cold Stress

8.1 Heat/Cold

Qatar has a hot desert climate with hot and humid summers and mild winters. The warm season (May - September) monthly daily average maximum temperatures range from 101 degrees Fahrenheit (°F) to 107 °F with an average temperature of 99 °F. The cold season lasts from December to March with monthly daily average temperatures range from 55 degrees Fahrenheit (°F) to 75°F with an average temperature of 77 °F. The health risk of heat stress/injury based on temperatures alone is Low (< 78 °F) from December – March, Moderate (78-81.9°F) to high (82-87.9°F) in April, October and November, and extremely high (≥ 88°F) from May – September. However, work intensity and clothing/equipment worn pose greater health risk of heat stress/injury than environmental factors alone (Reference 10). Managing risk of hot weather operations included monitoring work/rest periods, proper hydration, and taking individual risk factors (e.g., acclimation, weight, and physical conditioning) into consideration. Risk of heat stress/injury was reduced with preventive measures.

8.1.1 Short-term health risk:

Low to High, mitigated to Low: The risk of heat injury was reduced to low through preventive measures such as work/rest cycles, proper hydration and nutrition, and monitoring Wet Bulb Globe Temperature (WBGT). However, the risk may be greater of heat injury in unacclimatized or susceptible populations (older, previous history of heat injury, poor physical condition, underlying medical/health conditions), and those under operational constraints (equipment, PPE, vehicles). Confidence in the health risk estimate is low (Reference 4, Table 3-6). The health risk of cold injury is Low. Confidence in the health risk estimate is medium.

8.1.2 Long-term health risk:

Low: The long-term risk is Low. However, the risk may be greater for certain susceptible persons– those older (i.e., greater than 45 years), in lesser physical shape, or with underlying medical/health conditions. Long-term health implications from heat injuries may occur but are rare, especially from more serious injuries such as heat stroke. High heat in conjunction with various chemical exposures may possibly increase long-term health risks, though specific scientific evidence is not conclusive. The health risk of cold injury is Low. Confidence in these risk estimates is medium (Reference 4, Table 3-6).

9 Noise

9.1 Continuous

The 2015 OEHSA documented that there were several generators at the site; no other information was available in the DOEHRS or MESL from 01January 2003 through 31 December 2015 timeframe.

9.1.1 Short-term health risks:

Low: The short-term risk of noise injury with appropriate hearing protection use is low. Few exposed personnel (if any) are expected to have noticeable health effects during mission. Confidence in risk assessment is low (Reference 4).

9.1.2 Long-term health risks:

Low to moderate: The long-term risk of noise injury with appropriate hearing protection use is low with few exposed personnel (if any) are expected to develop delayed onset, irreversible effects. If protective measures are not used, the risk is elevated to moderate and many exposed personnel are plausibly expected to develop delayed onset, irreversible effects. Confidence in risk assessment is low (Reference 4).

9.2 Impulse

No specific hazard sources were documented in the DOEHRS or MESL from 01January 2003 through 31 December 2015 timeframe.

9.2.1 Short-term and Long-term health risks:

Not evaluated.

10 Unique Incidents/Concerns

10.1 Potential environmental contamination sources

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

10.2 Waste Sites/Waste Disposal

According to the 2015 OEHSA, all waste generated at CAS is labeled and documented by local standard operating procedures and prepared for proper transfer off post on a weekly basis. The waste that includes hazardous, residential, construction and regulated medical waste is collected and trucked off post for disposal by a local contracting company (Reference 12).

All wastewater is piped off site via Qatar municipal sewage according to the 2015 OEHSA report and there was no record of any wastewater spills (Reference 12).

10.3 Fuel/petroleum products/industrial chemical spills

The 2015 OEHSA reported having six JP-8 (jet fuel) containers, six diesel fuel containers that stored 7926 gallons each and three gasoline containers with two that stored 7926 gallons and one that stored 800 gallons of gasoline. There was no record of any known spills and there is no indication of any underground storage containers for POLs (Reference 12).

10.4 Pesticides/Pest Control:

The health risk of exposure to pesticide residues is considered within the framework of typical residential exposure scenarios, based on the types of equipment, techniques, and pesticide products that have been employed. Examples of equipment and techniques include enclosed bait stations for rodenticides, handheld equipment for spot treatments of insecticides and herbicides, and a number of ready-to-use (RTU) methods such as aerosol cans and baits. The control of rodents required the majority of pest management inputs, with the acutely toxic rodenticides staged as solid formulation lethal baits placed in tamper-resistant bait stations indoors and outdoors throughout cantonment areas. Nuisance insects, including biting and stinging insects such as bees, wasps, and ants, also required significant pest management inputs. Use of pesticides targeting against these pests generally involved selection of compounds with low mammalian toxicity and short-term residual using pinpoint rather than broadcast application techniques. No specific hazard sources were documented in DOEHRS or MESL data portal. Eight monthly pesticide application reports in the MESL data portal for Camp As Sayliyah (May 2013 to December 2013) list the usage of pesticides on the site. There were no other pesticide application reports from January 2003- December 2015. For each pesticide product applied during this period, the EPA approved label has been archived, providing a framework for how each pesticide was handled and applied (see below).

10.4.1 Insecticides

Insecticides used to control ants, bees, bed bugs, termites and cockroaches include *Fipronil, Abamectin B1, β-Cyfluthrin, 1, 2-Propanediol, (S)-hydroprene, d-trans Allethrin, Phenothrin and delamethrin.*

10.4.2 Short-term and Long-term health risks

Low: Long-term health risk is Low. Confidence in the health risk assessment is low (Reference 4, Table 3-6).

10.5 Asbestos

There was no data available to evaluate.

10.6 Lead Based Paint

There was no data available to evaluate.

10.7 Burn Pit

There were no burn pits used at Camp As Sayliyah during the timeframe (JAN 1 2003 - DEC 31 2015) of this assessment.

11 References[1]

1. Defense Occupational and Environmental Health Readiness System (referred to as the DOEHRS-EH database) at https://doehrs-ih.csd.disa.mil/Doehrs/. Department of Defense (DoD) Instruction 6490.03, *Deployment Health*, 2006.

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

3. Joint Staff Memorandum (MCM) 0017-12, Procedures for Deployment Health Surveillance, 2012.

4. USAPHC TG230, June 2013 Revision.
5. 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.

[1] NOTE. The data are currently assessed using the 2013 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 assess non-drinking uses of water conservatively.

6. Modification 12 to United States Central Command Individual Protection and Individual Unit Deployment Policy, 02 December 2013.

7. CDC. 2012. Morbidity and Mortality Weekly Report. Imported Human Rabies in a U.S. Army Soldier. May 4, 2012. 61(17); 302-305.

8. Armed Forces Pest Management Board: http://www.afpmb.org/content/venomous-animals-country-q#Qatar. U.S. Army Garrison - Forest Glen, Silver Spring, MD.

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

10. 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.

11. IOM (Institute of Medicine). 2011. Long-term health consequences of exposure to burn pits in Iraq and Afghanistan. Washington, DC: The National Academies Press.

12. OEHSA Report for Camp As Sayliyah, April 2013.

13. OEHSA Report for Camp As Sayliyah, May 2014.

14. OEHSA Report for Camp As Sayliyah, May 2015.

15. Engelbrecht, J.P., E.V. McDonald, J.A. Gillies, and A.W. Gertler. 2008. Department of Defense Enhanced Particulate Matter Surveillance Program (EPMSP). Final report. Desert Research Institute, Reno, NV. February 2008

12 Where Do I Get More Information?

If a provider feels that the Service member's or Veteran's current medical condition may be attributed to specific OEH exposures at this deployment location, he/she can contact the Service-specific organization below. Organizations external to DoD should contact Deputy Assistant Secretary of Defense for Health Readiness Policy and Oversight (HRP&O).
Army Public Health Center Phone: (800) 222-9698. http://phc.amedd.army.mil/
Navy and Marine Corps Public Health Center (NMCPHC) (formerly NEHC) Phone: (757) 953-0700. http://www.med.navy.mil/sites/nmcphc/Pages/Home.aspx
U.S. Air Force School of Aerospace Medicine (USAFSAM) (formerly AFIOH) Phone: (888) 232-3764. http://www.wpafb.af.mil/afrl/711hpw/usafsam.asp
DoD Health Readiness Policy and Oversight (HRP&O) Phone: (800) 497-6261. http://fhpr.dhhq.health.mil/home.aspx