Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Name: Camp Taji, Iraq

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

PURPOSE: This POEMS documents the DoD assessment of base camp level occupational and environmental health (OEH) exposure data for Camp Taji. It presents the identified health risks and associated medical implications. The findings are based on information collected from September 2003 through September 2009 to include OEH sampling and monitoring data (e.g. air, water, and soil), field investigation and health assessment reports, as well as the country specific information on endemic diseases provided by NMIC. While this assessment may reflect similar exposures and risks pertaining to historic or future conditions at this site, the underlying data is limited to the time period(s) and area(s) sampled and will not reflect fluctuations or unique occurrences. It also may not be representative of variations during the timeframe. To the extent data allow, this summary describes the general ambient conditions at the site and characterizes the risks at the *population–level*. While useful to inform providers and others of potential health effects and associated medical implications, it does not represent an individual exposure profile. Individual exposures and specific 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: Camp Taji (originally Al Taji Army Airfield) is located approximately 20 - 30 kilometers Northwest of Baghdad, near the city of Taji (population 144,000). Before the war, the sight was a huge military/industrial facility. Camp Taji is divided with Iraqi and US sides. Camp Taji is bordered by canals to the north and south, by railroad tracks to the west, the Tigris River to the east, and is bisected by Highway 1 (MSR Tampa). The surrounding area is primarily small farms and villages. There is a market area to the southwest and a large industrial complex, the Al Samud Plant, about 3 kilometers (km) north along Highway 1. Most cultivated land is irrigated by a system of canals and ditches, some well-prepared and concrete lined, others merely ditches in the soil. The US forces at Taji include approximately 11,000 personnel, a majority of which are Army personnel. The camp also houses Coalition Forces and New Iraqi Army personnel.

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

Short-term health risks & medical implications:

The following may have caused acute health effects in some personnel *during deployment at Camp Taji*: Inhalable coarse particulate matter less than 10 micrometers in diameter (PM_{10}); food/waterborne diseases; other endemic diseases, and heat stress. For PM_{10}, 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. Exposures may result in mild short-term health effects (e.g., eye, nose or throat irritation) in some personnel while at this site. 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 Camp Taji. For food/waterborne diseases, ingesting local food and water from unapproved sources, can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (Hepatitis A, Typhoid fever, protozoal diarrhea). Hepatitis E, cholera and brucellosis are rarer. For heat stress, risk is greater for susceptible persons including those older than 45, of low fitness level, not properly acclimated to hot weather or with a history of a previous heat injury or underlying medical conditions. Risks from food/waterborne diseases and heat stress can be reduced with preventive medicine controls and mitigation. Vector-borne endemic diseases (cutaneous leishmaniasis, Crimean-Congo hemorrhagic fever, Sandfly fever), may constitute a significant risk due to exposure to biting vectors, although 2009 data indicate that with controls risk may be low. For respiratory diseases (H1N1, tuberculosis (TB)), personnel in close-quarter conditions are at risk for person-to-person spread for unvaccinated personnel. For water contact diseases (Schistosomiasis, Leptospirosis), activities involving extensive contact with surface water increase risk, animal contact diseases (Rabies, Anthrax, Q fever), pose year-round risk. Personnel who reported with symptoms or required treatment while at this site should have exposure/treatment noted in medical record on an SF 600 (Chronological Record of Medical Care).

Long-term health risks & medical implications:

The hazards associated with potential long-term health effects at Camp Taji include visceral leishmaniasis and inhalable fine particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$). Leishmaniasis: For the vector-borne endemic disease, visceral leishmaniasis, this disease may constitute a significant risk due to exposure to biting vectors. However, 2009 data indicate that the risk after controls is low. $PM_{2.5}$: Some otherwise healthy personnel who were exposed for a long-term period to $PM_{2.5}$ levels could develop certain health conditions (e.g., reduced lung function, cardiopulmonary disease). Personnel with a history of asthma or cardiopulmonary disease may be more likely to develop such chronic health conditions. While the $PM_{2.5}$ exposures are documented and archived, at this time there are no specific recommended, post-deployment medical surveillance evaluations or treatments. Providers should consider overall individual health status (e.g., any underlying conditions/ susceptibilities) and any potential unique individual exposures (such as occupational or specific personal dosimeter data) when assessing individual concerns. Certain individuals may need to be followed or 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).

Approved for CENTCOM Surgeon:
POC CENTCOM Force Health Protection officer, 2 July 2010

Where Do I Get More Information?

If a provider feels that the Service member's or Veteran's current medical condition may be attributed to specific OEH exposures at this deployment location, he/she can contact the Service specific organization below. Organizations external to DoD should contact DoD Force Health Protection and Readiness (FHP & R).

U.S. Army Public Health Command (Prov) Phone: (800) 222-9698 http://phc.amedd.army.mil/home/	**Navy and Marine Corps Public Health Center (NMCPHC)** (formerly NEHC) Phone: (757) 953-0700 http://www-nehc.med.navy.mil	**US Air Force School of Aerospace Medicine (USAFSAM)** (formerly AFIOH) Phone: (888) 232-3764 http://www.brooks.af.mil/units/airforceinstituteforoperationalhealth/index.asp	**DoD Force Health Protection and Readiness (FHP & R)** Phone: (800) 497-6261 http://fhp.osd.mil

POEMS

Population-Based Health Risk Estimates – Camp Taji, Iraq [1, 2]

Sources of Identified Health [3]	Health Risk Assessment Summary [4]	
	Short Term Health Risk	**Long Term Health Risks**
AIR	**Airborne Substances – Overall Short Term Risks: Variable (Low to High)**	**Airborne Substances – Overall Long-Term Risks: Variable (Low to Moderate)**
Particulate matter (PM_{10})	Variable (Low to High): Short-term health effects (e.g., upper respiratory tract irritation) probable when levels are high. More serious effects possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).	Not evaluated - PM_{10} chronic effect health guidelines do not currently exist
Particulate matter ($PM_{2.5}$)	Low: Majority of the time no anticipated acute health effects from $PM_{2.5}$; certain peak levels may produce effects as described for PM_{10}.	Moderate: Small percentage of persons may be at increased risk for developing chronic conditions (particularly those who are more susceptible to acute effects like asthma or cardiopulmonary disease).
ENDEMIC DISEASE	**Endemic Disease – Overall Short Term Risks: Variable (Low to High)**	**Endemic Disease – Overall Long Term Risks: Variable (none to moderate)**
Food borne/Waterborne (e.g., diarrhea- bacteriological)	High: Diarrhea Bacterial, Hepatitis A, Typhoid /Paratyphoid fever Moderate: Diarrhea – protozoal, Brucellosis, Diarrhea - cholera, and Hepatitis E	None identified
Arthropod Vector Borne	Moderate: Leishmaniasis*- cutaneous, Crimean-Congo hemorrhagic fever, Sandfly fever*. (*2009 site data indicates that with controls risk may be Low.) Low: Plague, Rickettsioses tickborne (spotted fever group), Typhus - murine (flea-borne), West Nile fever, Sindbis (and Sindbis-like viruses)	Moderate: Leishmaniasis* – visceral (*2009 site data indicates that with controls risk may be Low.)
Respiratory	Moderate: H1N1 Moderate: Tuberculosis (TB) Low: meningococcal meningitis	None identified. TB is evaluated as part of the PDHA (Post Deployment Health Assessment). A TB skin test is required post-deployment if potentially exposed.
Water-Contact (e.g. wading, swimming)	Moderate: Schistosomiasis and Leptospirosis	None identified
Animal Contact	Moderate: Rabies, Anthrax, Q fever, Low: H5N1 avian influenza	None identified
HEAT/COLD STRESS	**Heat/Cold – Overall Short Term Risks: Variable (High to Moderate)**	**Heat/Cold – Overall Long Term Risks: Low**
Heat	Variable (High to Moderate): High risk of heat injury in unacclimated personnel and those who have had a prior heat injury. Risk reduced to moderate through preventive measures.	Low
NOISE	**Noise – Overall Short-Term Risk: Low**	**Noise – Overall Long-Term Risk: Low**
Continuous	Low	Low
FUEL /PETROLEUM PRODUCTS /INDUSTRIAL CHEMICAL SPILLS	**Fuel/ petroleum products /industrial chemical spills – Overall Short-term risk: Low**	**Fuel/ petroleum products /industrial chemical spills – Overall Long-term risk: Low**
	Low	Low
WASTE SITES/ WASTE DISPOSAL	**Waste Sites/Waste disposal – Overall Short term risk: Low**	**Waste Sites/Waste disposal – Overall Long-term risk: Low**
	Low	Low
PESTICIDES/ PEST CONTROL	**Pesticides/Pest Control – Overall Short term risk: Low**	**Pesticides/Pest Control – Overall Long-term risk: Low**
	Low	Low
UNIQUE INCIDENT/CONCERNS		
Burn Pit Evaluation	Low: Short-term health effects could include eye, nose, throat and lung irritation.	Low: there is significant uncertainty as to the reported risk level based on methodological concerns

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

[2] This assessment is based on specific data and reports obtained from the January 2003 through September 2009 timeframe. It is considered a current representation of general site conditions but may not reflect certain fluctuations or unique exposure incidents. Acute health risk estimates are generally consistent with field-observed health effects.

[3] This Summary Table is organized by major categories of identified sources of health risk. It only lists those sub-categories specifically identified and addressed at Camp Taji. The health risks are presented as Low, Moderate, High or Extremely High for both acute and chronic health effects. The risk level is based on 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 USACHPPM. Where applicable, "None Identified" is used when though an exposure was identified, no risk of either a specific acute or chronic health effects were determined. More detailed descriptions of OEH exposures that were evaluated but determined to pose no health risk are discussed in the following sections of this report.

[4] Risks in this Summary Table are based on quantitative surveillance thresholds (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 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.

REFERENCES: Camp Taji, Iraq POEMS

POEMS developed in accordance with:

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

Site description and baseline information obtained from:

Per references 4, POEMS characterizes separate risk estimates for acute and chronic health effects resulting from brief one time exposures as well as repeated, long term exposures (which are defined as > three months up to a lifetime of (reference 4)). To ensure adequate data for a long term exposure assessment, the POEMS are based on information collected from a time period that encompasses at least a years' time.

5. Environmental Health Site Assessment (EHSA) 2006.
6. Occupational and Environmental Heal Site Assessment (OEHSA) 2009.

Sampling data was obtained from the:

7. Defense Occupational and Environmental Health Readiness System (referred to as the **DOEHRS-EH database**) at https://doehrs-ih.csd.disa.mil/Doehrs/. Some of the data may be classified or otherwise have some restricted distribution. The obtained data was searched for between 01 January 2003 to 14 September 2009 and downloaded on 12 November 2009. It is noted that additional data results including from samples taken during that timeframe may have been added to the DOEHRS after this data set was downloaded for evaluation. Though not captured in this assessment, they will be evaluated in future assessments or updates. Some of the data may also be classified or otherwise have some restricted distribution. See discussion below.

Additional environmental health reports/survey documents are from the:

8. DoD OEHS Data Portal: https://doehsportal.apgea.army.mil/doehrs-oehs/ . Some of the data and reports used may be classified or otherwise have some restricted distribution.

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

9. USACHPPM TG230, 2009 Revision, Version 13 (final draft under review) Chemical Exposure Guidelines for Deployed Military Personnel TG230 Version 2.1 2004 currently being updated to include new and updated MEG values and updated risk assessment procedures designed to reflect acute and chronic hazard severity definitions in MCM 0028-07. The revised TG230 (Version 13 (final draft under review) and associated MEG database (Version 18) are currently being staffed for review but served as the basis for this assessment of chemical hazards in air, soil, and water. For further information, contact USAPHC Environmental Health Risk Assessment Program at 410-436-2953 or DSN 584-2953.
10. CHPPM 2008 Particulate Matter Factsheet; 64-009-0708, 2008

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

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

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NOTE. The DOEHRS-EH database was queried to obtain the available sample data for air, soil, and drinking and non-drinking water sources at Taji. The data are currently assessed using the final draft TG230 2009 Revision (V13) and MEGs (Version 18) described above. The general method involves an initial screen of the data which eliminates all chemical substances not detected above 1-yr negligible MEG. Those substances screened out are not considered acute or chronic health hazards so are not assessed further. For remaining substances, acute and chronic health effects are evaluated separately for air and water (soil is only evaluated for long term risk). This is performed by deriving separate short-term and long term average concentrations that are compared to MEGs that were derived for similar exposure durations. If less than or equal to negligible MEG the risk is Low. If levels are higher than negligible then there is a chemical-specific toxicity and exposure evaluation by appropriate SMEs, which includes comparison to any available marginal, critical or catastrophic MEGs. For drinking water 15 L/day MEGs are used for the screening while site specific 5-15 L/day are used for more detailed assessment. For non-drinking water (such as that used for personal hygiene or cooking) the 'consumption rate' is

limited to 2L/day (similar to the EPA) which is derived by multiplying the 5L/day MEG by a factor of 2.5. This value is used to conservatively assess non-drinking uses of water.

Discussion of Health Risks at Camp Taji by Source

The following Tables describe the major source categories of potential health risk that were evaluated at Camp Taji. For each category, the evaluation process includes identifying what, if any, specific sub-categories/health concerns are present. This initial step results in "screening out" certain sub-categories that pose no identifiable health risk (for example if all data is below screening levels). While these Tables identify sub-categories that have been determined to present no identifiable health risk, the Summary Table on the previous page only contains those sub-categories that were determined to pose some level of potential health risk.

1. AIR

Site-Specific SOURCES Identified (all those checked):

☑ Wind-blown Sand	☑ Commercial Industry _____	☑ Other : vehicles
☑ Burn pits	☑ Agricultural	□ Not Determined

Various airborne contaminants have been identified through monitoring and sampling efforts at Camp Taji between 2003 and 2009. Windblown dust and sand are a primary source of the particulate matter exposures at the site. There are a number of industrial activities including fuel storage and distribution, water and wastewater treatment, and concrete and asphalt production, located on and around Camp Taji that may contribute to air contaminants such as dust, metals and chemical gases. Additional exposure results from the Army's use of open burn pits to dispose of waste/refuse such as paper, plastic, and wood. Samples obtained from the site included locations such as fuel points, buildings, the burn pit and the incinerator. These were used to represent the overall ambient air conditions of the site.

Assessment of Data and Identified Risks

Particulate matter, 10 microns (PM_{10}) (see CHPPM 2008 PM factsheet; 64-009-0708 for more details)	**Sample data/Notes:** Short-term (24-hour) PM_{10} MEGs ($\mu g/m^3$): Negligible MEG=250, Marginal MEG=420, Critical MEG=600; Long-term PM_{10} MEG: Not Available (see chronic risk note). Degree of risk is estimated based on comparison of concentrations to specified MEGs. The range of 24-hour PM_{10} concentrations in 183 samples from September 2003–September 2009 was 18 to 3359 $\mu g/m^3$ with the average at 348 $\mu g/m^3$. Only sampled years 2006, 2008, and 2009 had adequate data to characterize risk however, the general frequencies of short term risk levels are expected to be similar for other years. There were 86 samples taken near the burn pit during 2006-2009, these samples were included in the overall samples and then discussed separately in section 10 of this document. The maximum concentration of the samples when evaluated without the burn pit samples stayed the same. When looking at the daily PM_{10} risk levels, the majority of the samples (60%) identified no hazard, followed by a low risk level for 20% of the samples. The risk level was high for 14% of the days sampled.
	Short term risk: Variable (Low to High). Short term risk is based on comparison of daily concentrations to 24-hour MEGs. The variable risk levels are due to significant fluctuation in daily concentrations. Respiratory effects can increasingly impact real-time health and mission capabilities as they exceed higher levels of MEGs. Acute effects to relatively healthy troops are mostly eye, nose, and throat irritation, and respiratory effects (sneezing, adaptive responses such as coughing, sinus congestion and drainage) that can be exacerbated by increased activity. These effects are consistent with those generally reported from the field. Confidence in the risk estimate is high.
	Long term risk: Not evaluated-no available health guidelines. EPA has retracted its long-term standard (NAAQS) for PM_{10} due to an inability to clearly link long-term health effects with chronic PM_{10} exposure levels.
Particulate matter, 2.5 microns ($PM_{2.5}$) (see CHPPM 2008 PM factsheet; 64-009-0708 for more details)	**Sample data/Notes:** Short-term (24-hour) $PM_{2.5}$ MEGs ($\mu g/m^3$): Negligible MEG=65, Marginal MEG=250, Critical MEG=500; Long-term $PM_{2.5}$ MEGs: Negligible MEG=15, Marginal MEG=65. Degree of risk is estimated based on comparison of concentrations to specified MEGs. The range of 24-hour $PM_{2.5}$ concentrations in 66 samples from February 2006 –September 2009 was 20 to 397 $\mu g/m^3$ with the average of 115 $\mu g/m^3$. Out of the total 66 samples, 59 samples taken during 2006, 2007 and 2009 were designated as burn pit samples. These samples were included in this evaluation and will be discussed separately in Section 10. The daily risk levels for PM2.5 were at a low risk level for the majority of the days sampled (49% of the time) and there was no hazard identified 46% of the time. A moderate risk level for

	only 5% of the time. A high risk level was never reached on any of the days sampled.
	Short term risk: Variable (Low to Moderate). Short term risk is based on comparison of daily average concentrations to 24-hour MEGs. The variable risk levels are due to significant fluctuation in daily concentrations. Respiratory effects can increasingly impact real-time health and mission capabilities as they exceed higher levels of MEGs. During the highest levels of $PM_{2.5}$, a few personnel may have experienced notable eye, nose, or throat irritation that can be exacerbated by increased activity. However most personnel would have experienced only mild effects. Pre-existing health conditions (e.g., asthma or cardiovascular diseases) may be exacerbated. These effects are consistent with those generally reported from the field. Confidence in the risk estimate is medium.
	Long term risk: Moderate. Chronic risk is based on comparison of the average sample concentration to the long-term MEGs. Unlike PM_{10}, chronic $PM_{2.5}$ exposures are potentially associated with certain long-term health consequences. The average $PM_{2.5}$ concentration for samples collected was 115 $\mu g/m^3$, which is above the marginal long-term MEG of 65 $\mu g/m^3$. With repeated exposures above this level, the risk that a small percentage of susceptible personnel may develop chronic conditions (such as, reduced lung function or exacerbated chronic bronchitis, COPD, asthma, atherosclerosis, or other cardiopulmonary diseases) increases. Those with a history of asthma or cardiopulmonary disease have a higher risk for developing these chronic conditions. Confidence in risk estimate is low to medium due to limitations in field data and health effects data.
Metals	**Sample data/Notes:** 160 samples from January 2003 – September 2009 were analyzed for metals. None of the analyzed metals in the samples were found at concentrations above a short- or long-term MEG.
	Short Term and Long Term risks: None identified based on the available sampling data.
Chemical Pollutants (gases and vapors)	**Sample data/Notes:** 26 samples collected from August 2007– September 2009 were analyzed for organic chemicals. Only two chemicals, 1,2-dibromo-3-chloropropane [DBCP] and Benzene were found at concentrations higher than their respective 1-year negligible MEGs. The concentration for DBCP (1.3 $\mu g/m^3$) did not exceed its short term, 1-hour MEG (14-day and 8-hour MEGS were unavailable), and because it was detected in only one out of 26 samples (< 5% detection frequency) it was not considered either a short or long term hazard. Benzene's concentration (63 $\mu g/m^3$) also did not exceed its short-term 14-day negligible MEG and it did not exceed its long term 1 year negligible MEG and was eliminated from any further assessment. NOTE: MEGs are not available for all analytes detected so the overall risk presented here may be underestimated.
	Short Term and Long Term risks: None identified based on available sampling data.

2. SOIL

Site-Specific SOURCES of Contaminants Identified (all those checked):

☑ Waste Site/Burn pits	□ Commercial Industry	□ None
☑ Agricultural	☑ Other : vehicles	□ Not Determined

The surrounding area of Camp Taji is mainly agricultural, with an industrial complex located nearby to the north. Highway 1 intersects the camp, running north and south.

Assessment of Data and Identified Risks

Analyses includes metals/inorganics as well as organics	**Sample data/Notes:** There were no contaminants detected in multiple soil samples (collected from August 2003–September 2009) exceeded an applicable 1-year negligible MEG. These samples include: 40 samples for Semi Volatile Organics (SVOCs), 40 samples for Polyaromatic Hydrocarbons (PAH), 41 samples for metals, and 38 samples for insecticides/herbicides.
	Short Term and Long Term risks: None identified based on the available sampling data. Currently, sampling data for soil is not evaluated for short term risk and all detected contaminants were eliminated for long term risk because the average concentrations were all below the applicable 1-year negligible MEG**.**

3a. WATER: Used for Drinking

Identified Water Supplies

☑ Bottled; Local procured	□ Military Bottled/Packaged (unknown)	☑ ROWPU	□ Municipal Sources

The primary source of drinking water at Camp Taji is commercial bottled water provided by approved sources and stored at the Class I Point. Bottled water is also distributed to several satellite locations for use. Bottled water found on Camp Taji consisted of the following brands: Rawdatain, Abraaj, Hayat, Mozn, Nova and bottled water produced at the LSA Anaconda-Balad Airbase bottled water plant. Routine field tests conducted by Preventive Medicine Personnel include bacteriological, CBRN, free available chlorine (FAC) and other sanitation surveillance parameters per *TB Med 577*. Reverse Osmosis Water Purification Units (ROWPU) produced water is used as a secondary drinking (e.g. cooking and ice production) water source and for personal hygiene at Camp Taji. Multiple samples from the primary and secondary drinking water were taken throughout 2006, 2007, 2008 and 2009. Each sample was not analyzed for all chemical substances; however most chemical substances were sampled between 24 and 28 times.

Assessment of Data and Identified Health Risks

Analyses include metals/inorganics as well as organics	**Sample data/Notes** Seven samples of primary drinking water (from bottled water) were obtained in April 2006 and there was one sample taken in August 2009. No other years were sampled. All samples were below the applicable 1-yr Negligible MEGs. 15 samples of secondary drinking water (from the ROWPU) were obtained from 2006-2009. Out of the secondary drinking water samples, only total cyanide was greater than its 1-yr Negligible MEG for a 15L/d consumption rate(3 of 15). A comparison between the maximum concentration for cyanide with its14-day, 15L/d Negligible MEG, determined the maximum concentration was not a short term risk. The annual average was generated for cyanide and was compared with the 1-yr Negligible MEG. The annual average concentration for cyanide did not exceed the MEG and therefore is not considered to be a long term risk.
	Short Term and Long Term risks: None identified based on the available sampling data.

3b. WATER: Used for Other Purposes(Personal Hygiene, Cooking, Showering, etc)

Identified Water Supplies

□ Bottled; Local procured	□ Military Bottled/Packaged (unknown)	□ ROWPU	☑ Municipal Sources

The nondrinking water samples were separated into "treated" and untreated" samples. There was one water sample taken in 2008, that was labeled as non-drinking, "untreated "water and this sample was evaluated separately from the "treated" nondrinking samples. A total of 22 "treated" nondrinking samples were taken between April 2006- August 2009. Reverse Osmosis Water Purification Units (ROWPU) produced water is used as a water source for personal hygiene at Camp Taji.

Assessment of Data and Identified Health Risks

Analyses include metals/inorganics as well as organics	**Sample data/Notes:** None of the chemical substances analyzed in the non-drinking water sample were greater than 2.5 times the 1-yr Negligible MEG for the 5L/d rate.
	Short Term and Long Term risks: None identified based on the available sampling data.

4. MILITARY UNIQUE

The DOEHRS-EH and OEHS (Document Portal) databases where searched for any information on this topic along with the EHSA from March 2006 and the Occupational and Environmental Health Site Assessment (OEHSA) 2009 report. Both the EHSA 2006 and the OEHSA 2009 reports did not note any military unique issues found at the site.

Chemical Biological, Radiological Nuclear (CBRN) Weapons:

No specific hazard sources documented in DOEHRS or DoD OEHS Portal

***Depleted Uranium (DU)*:**
No specific hazard sources documented in DOEHRS or DoD OEHS Portal
Ionizing Radiation:
No specific hazard sources documented in DOEHRS or DoD OEHS Portal
Non-Ionizing Radiation:
No specific hazard sources documented in DOEHRS or DoD OEHS Portal

5. ENDEMIC DISEASE

All information was taken directly from the National Center for Medical Intelligence (NCMI) (https://www.intelink.gov/ncmi/index.php). Infectious Disease Risk Assessment for Iraq, - dated in 25 February 2009 and accessed January 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 on how it is transmitted from person to person came from the World Health Organization's (WHO) Fact Sheet No. 141 on Meningococcal Meningitis.

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 US conditions. Most identified disease risks can and are being mitigated with military preventive medicine measures/policies.

Food borne and Waterborne Diseases

Sanitation is generally poor throughout the country, including in major urban areas. Local food and water sources (including ice) are heavily contaminated with pathogenic bacteria, parasites, and viruses to which most U.S. service members have little or no natural immunity. Key disease risks are summarized below:

Diarrheal diseases (bacteriological) can be expected to temporarily incapacitate a very high percentage of personnel (potentially over 50% per month) within days if local food, water, or ice is consumed. Unapproved food sources have been identified by local medical detachments to include unapproved sodas, dietary supplements, packaged fruit drinks, candy and ice cream. Field conditions (including lack of hand-washing and primitive sanitation) may facilitate person-to-person spread and epidemics. Typically these result in mild disease treated in outpatient setting; recovery and return to duty in less than 72 hrs with appropriate therapy.

Hepatitis A, typhoid fever, and diarrhea-protozoal can cause prolonged illness. Hepatitis A and Typhoid fever can cause prolonged illness in a small percentage of infected personnel, (less than 1% per month) and are considered a high risk while diarrhea-protozoal are considered a moderate risk if no preventive medicine measures are taken to mitigate, although cases for all are rare. Though much rarer, other potential diseases in this area are considered a a moderate risk and include: Hepatitis E, diarrhea-cholera, and brucellosis.

Short Term and Long Term health risks: The overall short term risk associated with Food borne and Waterborne diseases at Camp Taji is considered High (bacterial diarrhea, Hepatitis A, Typhoid fever) to Moderate (depending on the disease) if local food or water is consumed from unapproved sources. Preventive Medicine measures reduce the risk estimate to Low. There was no long term risk identified.

Arthropod Vector-Borne Diseases

Ecological conditions support populations of arthropod vectors, including mosquitoes, ticks, and sandflies, with variable rates of disease transmission. A variety of vector-borne diseases occur at low or unknown levels; as a group, these diseases may constitute a significant risk. Personnel exposed to mosquitoes, ticks, sandflies, or other biting vectors are at risk during day or night. While the following diseases and risk levels have been identified for this country/area by the NCMI, specific site vector surveillance program field data (cited in 2009 OEHSA) indicates that no mosquito or sandfly have tested positive for leishmaniasis or sandfly fever.

Leishmaniasis is transmitted by sand flies. The disease risk is highest when sand flies are most prevalent in July through late September. There are two forms of the disease–cutaneous (acute form) and visceral, a more latent form of disease. The leishmaniasis parasites may survive for years in infected individuals and this infection may go unrecognized by physicians back in the U.S. Though general area/country risk is considered moderate, since specific Taji site vector surveillance program field data (cited in 2009 OEHSA) indicates that no mosquito or sandfly have tested positive for leishmaniasis- t he risk at this site is considered Moderate to Low.

Crimean-Congo hemorrhagic fever most commonly occur as sporadic cases or clusters of cases and is transmitted by tick bites or occupational contact with blood or secretions from infected animals. The risk is moderate but cases are rare.

Sandfly fever is transmitted by sandflies and is considered a moderate risk for the general area/country. Since it , occurs more commonly in children than adults and since specific Taji site vector surveillance program field data (cited in 2009 OEHSA) indicates that no mosquito or sandfly have tested positive for leishmaniasis- the risk at this site is considered Moderate to Low.

5. ENDEMIC DISEASE

All information was taken directly from the National Center for Medical Intelligence (NCMI) (https://www.intelink.gov/ncmi/index.php). Infectious Disease Risk Assessment for Iraq, - dated in 25 February 2009 and accessed January 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 on how it is transmitted from person to person came from the World Health Organization's (WHO) Fact Sheet No. 141 on Meningococcal Meningitis.

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 US conditions. Most identified disease risks can and are being mitigated with military preventive medicine measures/policies.

Plague and Typhus- murine are both present, in rare cases and typically occur in more urban areas (Plague) and coastal and port towns (Typhus-murine) both are transmitted by rats and their flea populations, these diseases are associated with a low risk estimate.
Rickettsioses-tickborne, occur mostly as sporadic cases in humans and are associated with increased tick contact, usually by dogs carrying infected ticks.
West Nile fever and Sindbis, are also present and both are maintained by the bird population and mosquitos that help to transfer the diseases from birds to humans.

Short Term and Long Term health risks:

Short term risk: Low-Moderate for Leishmaniasis - cutaneous (acute) Leishmaniasis, Crimean-Congo hemorrhagic fever, and Sandfly fever; and Low for the Plague, Riskettsioses-tickborne, Typhus-murine, West Nile fever, and Sindbis.
Long Term risk: Low-Moderate for the visceral (chronic) leishmaniasis

Water Contact Diseases

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

Leptospirosis is present in Iraq but at unknown levels. 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. The occurrence of flooding after heavy rainfall facilitates the spread of the organism because, as water saturates the environment, Leptospira present in the soil pass directly into surface waters. Leptospira 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.

Schistosmiasis has been identified in rare cases in Iraq. Humans release schistosome eggs through urine and feces which may be contaminating surface water. When water temperatures in lakes, streams, or irrigated fields, are at or above 68°F, the eggs hatch and release the larvae into the water. If the right type of freshwater snail is present in the water, the larvae penetrate the snail and eventually develop and emerge as free swimming cercariae that can infect humans by penetrating the skin of people while wading or swimming.

Short Term and Long Term health risks:

Short term risk: Moderate for Leptospirosis and Schistosmiasis.
Long term risk: No long term risks identified.

Respiratory Diseases

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. U.S. military populations living in close-quarter conditions are at risk for substantial person-to-person spread of respiratory pathogens.

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

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.

5. ENDEMIC DISEASE

All information was taken directly from the National Center for Medical Intelligence (NCMI) (https://www.intelink.gov/ncmi/index.php). Infectious Disease Risk Assessment for Iraq, - dated in 25 February 2009 and accessed January 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 on how it is transmitted from person to person came from the World Health Organization's (WHO) Fact Sheet No. 141 on Meningococcal Meningitis.

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 US conditions. Most identified disease risks can and are being mitigated with military preventive medicine measures/policies.

H1N1 (swine flu): Until widespread dissemination of the vaccine, the 2009-H1N1 influenza virus ("swine flu") posed a threat to U.S. personnel. At the time, NMIC assessed that there was increased potential for transmission and large outbreaks could have caused attack rates that exceed 10 percent per month. Military populations living in crowded or austere conditions where hand washing and personal hygiene were poor were particularly vulnerable to person-to-person spread. Attack rates in such populations could have approached 50 percent per month in absence of countermeasures. H1N1 disproportionately impacted 15- to 50-year-olds (military-aged persons). Almost all cases resembled typical seasonal influenza. Medical preventive measures are ongoing–overall medical risk associated with this transmissible disease is considerate moderate at Taji. The confidence in this assessment (per NCMI) is considered Medium to High.

Short Term and Long Term health risks:
Short term risk: Low for Meningococcal meningitis. Moderate for Tuberculosis and H1N1.
Long term risk: No long term risks identified.

Animal- Contact Diseases

Rabies poses a year round moderate risk. Occurrence is well above U.S. levels due to ineffective control programs. Jackals and foxes are the primary sources of rabies in Iraq, but canine rabies is the most common source for transmission to humans.

Anthrax poses a moderate risk, but cases are rare. Anthrax is a naturally occurring infection; cutaneous anthrax is transmitted by direct contact with infected animals or carcasses, including hides. Eating undercooked infected meat can result in contracting Gastrointestinal Anthrax. Pulmonary Anthrax is contracted through inhalation of spores and is extremely rare.

Q-Fever poses a year round moderate risk. Rare cases are possible among personnel exposed to aerosols from infected animals, with clusters of cases possible in some situations. Significant outbreaks (affecting 1-50%) 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.

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

Short Term and Long Term health risks:
Short term risk: Low for H5N1 avian influenza. Moderate for Rabies, Anthrax, Q-fever.
Long term risk: No long term risks identified.

6. VENEMOUS ANIMAL/INSECT

Snakes, scorpions, and spiders

The OEHS Portal contained a few base camp assessments that did not mention any venomous animal/insects. Routine pest control measures are conducted at Camp Taji. See section 9 for more information.

Short Term and Long Term risks: No specific health risks identified.

7. HEAT/COLD STRESS

Heat

Summer (May through October) For 2008, Maximum High Temperatures ranged from 84-120 ºF, with an average of 106 ºF. Minimum Temperatures ranged from 70-104 ºF with an average of 81 ºF. Temperature extremes can

increase the potential for heat related injuries, including dehydration, heat exhaustion, and heat stroke. Early symptoms can include mild irritation, lethargy and inability to concentrate. Measures are in place to mitigate more serious effects of this critical hazard.

Winter (Nov through April) maximum high temperatures range from 77 to 102 ºF with an average of 90 ºF. Low temperatures range from 24-41 ºF with an average of 37 ºF.

Short term or Long term health risk: The short term risk of heat injury is High in unacclimatized personnel. Risk is reduced to Moderate through preventive measures (confidence is high). Long term risk of heat injuries Low but can occur – especially from more serious heat injuries such as heat stroke (confidence low to medium). It has also been considered possible that high heat in conjunction with various chemical exposures can increase long term health risks, though specific scientific evidence is not conclusive. The overall risk though Low may be greater to certain susceptible persons – those older (>45), in lesser physical shape, or with underlying medical /health conditions.

Cold

Short Term and Long Term risks: The risk of cold injury is low.

8. NOISE

Continuous:

The majority of the power supplied to Camp Taji is from the power generation facility. There are some stand-alone generators used within the camp, and barrier use is sporadic. However, the 2009 OEHSA noted that most stand-alone generators were located away from the troop living and work areas reduced noise levels to an acceptable risk.

Short Term and Long Term risks: Low risk with a low to medium confidence level.

Impulse:

Short Term and Long Term risks: No identified health risks.

9. OTHER UNIQUE OCCUPATIONAL HAZARDS

Fuel/petroleum products/ industrial chemical spills:

There are numerous aboveground storage tanks on Camp Taji, in addition to a bulk fuel storage area and aerial refueling point. No fuel/petroleum products or chemical spills were noted in either the EHSA 2006, the OEHSA 2009, or from a search of the DOEHRS-EH and OEHS (Document Portal) databases.

Short Term and Long Term risks: Low risk with a low to medium confidence level.

Waste Sites/Waste Disposal:

Medical waste is collected and then incinerated in the medical waste incinerator located on site. The medical waste incinerator has been operated at the camp since January 2005, and the incinerator ash is taken to the landfill. Solid waste is collected in dumpsters and picked up by garbage trucks then hauled to the landfill and burn pit (see Section 10).

Short Term and Long Term risks: Health risk from waste management operations is generally considered Low with exception of possible intermittent short term risk associated with burn pit operation if the winds blow smoke directly in personnel activity/living areas. See more details in Section 10.

Pesticides/Pest Control:

Vector control and animal trapping is contracted through KBR and pest control measures are in place and the following pesticides have been used at Camp Taji for pest control: Permthrin Arthropod Repellent, Golden Malrin, Final Blox, Final Rodenticide, Altosid XR, 565 XLO Plus, Tempo SC Ultra, Scourge, Ditrac Tracking Powder, Tufflo Oil, Damoil, Aqua Reslin, Mosquito Dunks, D-Phenophrine, Permitherin 0.5% and DEET. No specific pesticide hazards have been noted during January 2003-September 2009.

A number of pets/mascots or stray animals were evident on Camp Taji. One event, in included one dog that tested positive for rabies. All Soldiers that came in contact with this animal were immediately interviewed by health care providers and given appropriate vaccination treatments as needed.

Short Term and Long Term risks: Low risk with a low to medium confidence level.

10. UNIQUE INCIDENTS/CONCERNS

Burn Pit:

There are around 20 open burn pits located along the north boundary, approximately 0.2 kilometers away from the nearest inhabited area on Camp Taji and 3 to 5 kilometers from the majority of the population. The burn pits were initially used for solid waste disposal in 2003 and the group of burn pits are used continuously however only two or three of the burn pits are used at a time. Incinerators were added around 2008 but this did not eliminate the use of the burn pits. None of the key site evaluation reports (EHSA 2006, OEHSA 2009) describe the specific location of the burn pits in relationship to personnel activities/locations. Smoke from the burn pits was noticeable throughout much of Camp Taji.

While not specific to Camp Taji, the results from a detailed study evaluating the health effects of burn pits was completed at Joint Base Balad (JBB). Since the JBB burn pit is exceptionally large, it is considered a useful indicator of the types of risk associated with other burn pits such as at Camp Taji. The study was conducted at JBB between January 2007-April 2007 and again in October 2007-November 2007. Acid gases, and many typical combustion byproducts were not characterized at JBB.

Dioxins, furans, and polycyclic aromatic hydrocarbons were not detected above a 1-year MEG in the samples. Further results from a pilot study done to assess dioxin/furan levels in blood from 25 random soldiers stationed at JBB (from 2006 to 2007) indicated no significant body burden levels after a 1-year deployment. (The post-deployment dioxin/furan levels were consistent with background U.S. levels measured in the National Health and Nutrition Examination Survey (NHANES) data. Though risks assessed were considered low, this study did not evaluate several important components of burn pit smoke such as acid gases or inorganics - for example, ammonia, and chlorine were not analyzed. Because the potential implications of some of these components and the mixtures of combustion products is not known, the overall risk estimate is considered to have low to medium confidence.

At Camp Taji, dioxins, furans, polycyclic aromatic hydrocarbons, acid gases, and many typical combustion byproducts have not been characterized. A limited number of air samples only taken at or around the burn pits at Camp Taji were analyzed for PM_{10}, $PM_{2.5}$ metals and select volatile chemicals. There were 59 burn pit samples analyzed for $PM_{2.5}$ (39 samples from February-December 2006, 3 samples from January-February 2007, and 17 samples from July-September 2009) and the range of 24-hour $PM_{2.5}$ concentrations was 20 to 397 $\mu g/m^3$ with the average of 109 $\mu g/m^3$. There were 86 samples taken for PM_{10} concentrations (37 samples from February- December 2006, 6 samples from January-February 2007, 32 samples from July – December 2008, and 11 samples from April-July 2009). The range was 29 to 1086 $\mu g/m^3$ with the average PM_{10} concentration of 236 $\mu g/m^3$. No metals were found at concentrations above short- term or long-term MEGs. Benzene was detected in 22 of 26 samples and the only volatile chemical that had a maximum concentration (63 $\mu g/m^3$) above its 1-year negligible MEG of 60 $\mu g/m^3$. When compared to its short term, 14 day negligible MEG (600 $\mu g/m^3$), it did not exceed this value. When compared to its long term MEG, the average concentration for Benzene was below the respective 1 year negligible MEG and was eliminated from any further assessment.

Short term Risk: Variable (Low to High). The variable risk is due to significant fluctuation in daily concentrations. The typical short term risk levels are low for both PM_{10} and $PM_{2.5}$ and the peak risk level for both PM_{10} and $PM_{2.5}$ are high. Respiratory effects that can increasingly impact real time effects to relatively healthy troops include mostly eye, nose and throat irritation and respiratory symptoms (including sneezing and adaptive responses such as coughing, sinus congestion and drainage) that can be exacerbated by increased activity. These effects are consistent with those generally reported from the field. There is low to medium confidence in this risk estimate based on limited sampling data.

Long term Risk: Low. Based on the sampled media, chronic health effects from exposure to ambient air at Camp Taji are not expected. However, there is significant uncertainty as to the reported risk levels as many compounds were not evaluated. There is medium confidence in this risk estimate based on limited sampling data.

Approved for CENTCOM Surgeon:
POC CENTCOM Force Health Protection officer, 2 July 2010

ATTACH DOCUMENT

RECORD OF PROCESSING

TITLE OF REPORT/CORRESPONDENCE	INSTALLATION	CONTROL NUMBER
POEMS CAMP TAJI 2003-2009 FINAL 20100727	CAMP TAJI, IZ	
SURVEY DATES: FROM 2003 TO 2009	WRITER/PHONE NUMBER Pitrat/Markiewicz 5-7721	DIVISION

If you are implementing/staffing a new/revised CHPPM Directive (i.e., reg, pa., etc.), please answer the following questions.

What generated this request?

CENTCOM REQUEST

Is it internal or external? EXTERNAL

Has this draft been coordinated with the Directors? ☒ YES ☐ NO

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