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OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT

EDITION APRIL 2012

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NAVY WARFARE DEVELOPMENT COMMAND
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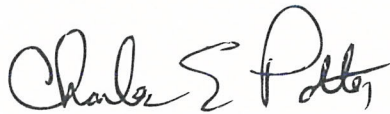
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2. NTRP 4-02.9 (APR 2012) is effective upon receipt.
3. NTRP 4-02.9 (APR 2012) is a new joint publication which provides guidance to deployed service preventive medicine personnel tasked with completing occupational and environmental health site assessments (OEHSAs) on military installations in a theater operational environment. It gives specific procedures for the execution of an OEHSA to identify and characterize occupational and environmental health threats that may affect the current and future health of deployed military personnel.
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Surgeon General of the Navy

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April 2012

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1. NTRP 4-02.9/AFTTP 3-2.82_IP/ATP 4-02.82 (APR 2012), OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT, is available in the Navy Warfare Library. It is effective upon receipt.
2. Summary.
 - a. This publication describes processes for conducting an occupational and environmental health site assessment (OEHSA) for deployed forces.
 - b. The scope includes current doctrine and tactics, techniques, and procedures for the conduct of an OEHSA.
 - c. The intended audience includes tactical level military Service preventive medicine personnel preparing for and conducting OEHSAs at military deployment locations.

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PREFACE

NTRP 4-02.9/AFTTP 3-2.82_IP/ATP 4-02.82 (APR 2012), Occupational and Environmental Health Site Assessment provides guidance to deployed Service preventive medicine personnel who plan to conduct occupational and environmental health site assessments (OEHSAs) on military installations in a theater operational environment. This publication provides specific tactical references to facilitate the execution of an OEHSA to identify and document occupational and environmental health (OEH) threat conditions that may affect the current and future health of deployed military personnel.

Use of trademarked name(s) does not imply endorsement by any Department of Defense component, but is intended only to assist in identification of a specific product.

PURPOSE

The purpose of this publication is to facilitate the implementation of deployment occupational and environmental health surveillance requirements outlined in Department of Defense instruction (DODI) 6490.03 (Aug2006), Deployment Health, and the Joint Chiefs of Staff memorandum MCM 0028-07 (Nov2007), Procedures for Deployment Health Surveillance. In addition, this publication is intended to provide a standardized methodology for the military Services to support organic preventive medicine assets in successfully accomplishing an OEHSA in various deployed environments.

APPLICATION

This publication is designed for use at the tactical level. The document supports and applies to preventive medicine personnel across all military Services that are preparing for and conducting OEHSAs at military deployment locations.

IMPLEMENTATION PLAN

Participating Service command offices of primary responsibility will review this publication, validate the information, and reference and incorporate it in Service and command manuals, regulations, and curricula as follows:

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USER INFORMATION

The United States Navy and Marine Corps Public Health Center (NMCPHC) developed this publication in cooperation with the Joint Environmental Surveillance Working Group and participation of the approving Service commands.

We encourage recommended changes for improving this publication. Please reference changes by specific page and paragraph, and provide a rationale for each recommendation. Send comments and recommendations to:

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WARNINGS, CAUTIONS, AND NOTES

The following definitions apply to warnings, cautions, and notes used in this manual:



WARNING

An operating procedure, practice, or condition that may result in injury or death if not carefully observed or followed.



CAUTION

An operating procedure, practice, or condition that may result in damage to equipment if not carefully observed or followed.

Note

An operating procedure, practice, or condition that requires emphasis.

WORDING

Word usage and intended meaning throughout this publication are as follows:

“Shall” indicates the application of a procedure is mandatory.

“Should” indicates the application of a procedure is recommended.

“May” and “need not” indicate the application of a procedure is optional.

“Will” indicates future time. It never indicates any degree of requirement for application of a procedure.

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 Add sentence at end of paragraph "See figure 2-1."
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CHAPTER 1

Background

1.1 GENERAL

According to the Joint Chiefs of Staff memorandum MCM 0028-07 (Nov2007), Procedures for Deployment Health Surveillance, “force health protection (FHP) provides the conceptual framework for optimizing force health readiness and protecting Department of Defense (DOD) personnel from occupational and environmental health (OEH) threats associated with deployments and military Service.” Deployment health surveillance is a critical component of health risk management and FHP. Deployment health surveillance includes identifying and assessing OEH threats, recognizing potential exposure pathways for deployed populations, documenting and reporting health risk, and implementing preventive measures to reduce the health risk posed by those OEH threats.

The occupational and environmental health site assessment (OEHSA) is the key information organizing process and report that supports OEH risk management activities on military installations in an operational environment. The OEHSA documents environmental conditions, identifies potential OEH threats, guides OEH data collection activities and further risk assessments, and summarizes acute or immediate risk mitigation actions. Health risk assessment (HRA) and health risk management are critical parts of deployment health surveillance. The OEHSA is the first step of the process that supports data collection and risk assessments over time. HRAs anticipate, identify, prioritize, and assess health threats and compare residual risks across potential controls and countermeasures. OEHSAs are a key element of the HRA process and assist Service preventive medicine personnel to adequately support FHP and local commanders’ risk management decisions concerning OEH threats.

1.2 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT

An OEHSA is an iterative process used to identify and provide recommendations to manage OEH threats and their sources at a particular deployment site (e.g., base camp, airbase, forward operating base (FOB)) with complete or potentially complete exposure pathways to a current or future deployed population. The OEHSA is a comprehensive baseline assessment followed by periodic reassessments. The OEHSA and subsequent reassessments are documented in the Defense Occupational and Environmental Health Readiness System (DOEHRS). The Joint Service (JS) OEHSA template (see appendix A) is a tool to help collect OEHSA data. Reassessments serve to validate complete and potentially complete exposure pathways previously recognized and identify new sources and exposure pathways resulting from site expansion, mission change, etc. Each iteration of the OEHSA is a snapshot in time of the current status of the site and provides the key operational tool for Service preventive medicine personnel to prioritize and manage all OEH threat assessments and to guide allocation of on-site preventive medicine resources.

The source is a point or non-point origin of a health threat (e.g., field of buried drums, burn pit, bulk chemical storage, incinerator, radio frequency emitters, fugitive emission from off-site industries, on-site sanding/painting operations, transportation route). The more specific the source information the Service preventive medicine personnel provides, the better.

In the timeframe between these iterative OEHSA reports, personnel collecting any occupational or environmental samples should always document (on the field data sheet and in the DOEHRS wherever possible) the rationale for the type and location of a sample as it relates to the conceptual site model (CSM) noted in the most current OEHSA. If the samples are for a new exposure pathway, this information should be used to update the next OEHSA.

The OEHSA takes time to fully develop. Service preventive medicine personnel should initiate the OEHSA as early as possible to meet FHP mandates. The goal is for the OEHSA to be initiated at a site before it is occupied by United States (U.S.) forces as a part of a preliminary hazard assessment (PLHA); however, operational requirements may dictate otherwise. For all permanent and semi-permanent sites (those open for more than 30 days) the initial OEHSA will be initiated within 30 days and the first iteration completed within 90 days (MCM 0028-07).

1.3 CONCEPTUAL SITE MODEL

The cornerstone of the OEHSA is the CSM. The CSM concisely describes what is known about a site, how the site may lead to OEH exposures, and the data gaps that must be filled to support informed health risk management decisions. As such, the CSM guides all environmental sampling for the site and provides the contextual information necessary for interpreting sampling data and using it in subsequent risk assessments. Finally, the CSM serves as a communication tool between successive Service preventive medicine personnel by defining the basis for sample collection and keeping them focused on data needs.

1.4 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT APPROACH

The iterative nature of the OEHSA process requires a multi-phase approach to fully assess all OEH threats, develop the CSM, and facilitate health risk assessment. Figure 1-1 outlines a phased approach to complete and continually update the OEHSA as new data are ascertained in the later phases of the process. Each phase and its respective steps will be described in detail in subsequent chapters of this document.

PREDEPLOYMENT ACTIVITIES			
Phase	Activity	Objectives	End Product(s)
I	PLANNING Gather site background and intelligence information	Identify potential OEH threat sources Prepare preliminary CSM	Preliminary CSM Initial OEHSA plan
DEPLOYMENT ACTIVITIES			
Phase	Activity	Objectives	End Product(s)
II	OEHSA 1–Site interviews and reconnaissance 2–Update CSM 3–Screen exposure points 4–Finalize CSM 5–Rank hazards 6–Control acute hazards 7–Information management	Gather more site-specific information Identify new exposure pathways and OEH threat sources Screen hazard presence at exposure points and determine exposure pathway viability Validate or revise preliminary CSM Rank hazards and pathways by relative risk and prioritize for further assessment Mitigate high/acute health risks immediately Document OEHSA on JS template	Initial OEHSA report –updated CSM –hazards ranked –acute hazards –controlled OEHSA entered in the DOEHSR

Figure 1-1. Occupational and Environmental Health Site Assessment Phased Approach (Sheet 1 of 2)

DEPLOYMENT ACTIVITIES (continued)			
Phase	Activity	Objectives	End Product(s)
III	ADDITIONAL DATA COLLECTION 1–Prepare OEH sampling and analysis plan (SAP) 2–Sample exposure points or points along CSM exposure pathways 3–Monitor environmental conditions 4–Improve characterization of population activities and exposures 5–Sampling and analysis and data generation 6–Information Management	Develop sampling strategies to obtain data representative of CSM exposure pathways at priority exposure point locations Generate new data from sampling and analysis Evaluate data usability per the CSM Produce actionable environmental data to support health risk assessment/management Record valid and relevant data on population exposure patterns relative to exposure points Document exposure assumptions	OEH SAP OEHSA data report(s) Samples and surveys entered in the DOEHRS or submitted to the Military Exposure Surveillance Library (MESL) when DOEHRS access is not available
IV	OEH RISK ASSESSMENT 1–Perform health risk assessment 2–Recommend/refine control measures 3–Repeat phase II and III over time and as necessary 4–Information management	Complete formal quantitative or semi-quantitative health risk assessments Understand residual health risk relative to available control options Document health risk assessment and management summaries	OEH risk assessment(s) Periodic occupational and environmental monitoring summaries (POEMSs) All reports archived in the DOEHRS

Figure 1-1. Occupational and Environmental Health Site Assessment Phased Approach (Sheet 2 of 2)

This phased approach highlights how the CSM is developed and refined throughout the entire OEHSA process. Figure 1-2 is a graphical representation of the CSM evolution. At the conclusion of Phase II of the OEHSA process, Service preventive medicine personnel will create a CSM for all complete and potentially complete exposure pathways.

1.5 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT ACTIVITIES

Although the OEHSA process remains constant, the specific activities or the tactical execution in support of that process may change depending on the mission and location associated with the OEHSA. For example, if the location is a bare site (i.e., without existing infrastructure or U.S. forces present) intended for establishing a FOB, Service preventive medicine personnel are more apt to focus on identifying only the existing OEH threats in order to provide the chain of command site layout recommendations that are intended to minimize future OEH health risks (e.g., preventing tent city build-up adjacent to a landfill) when the site is established. Any sampling taken during this scenario would be for source identification only, in order to characterize the site based on existing OEH threats. Figure 1-3 provides a summary of specific OEHSA activities that should be performed during phases I and II of the OEHSA process. Completion of Phase II and entering the OEHSA in the DOEHRS fulfills the commander’s requirement for completing the OEHSA. Further characterization of exposure pathways by environmental and/or personal sampling in Phase III supports risk assessment/management and future deployment site reassessment during Phase IV.

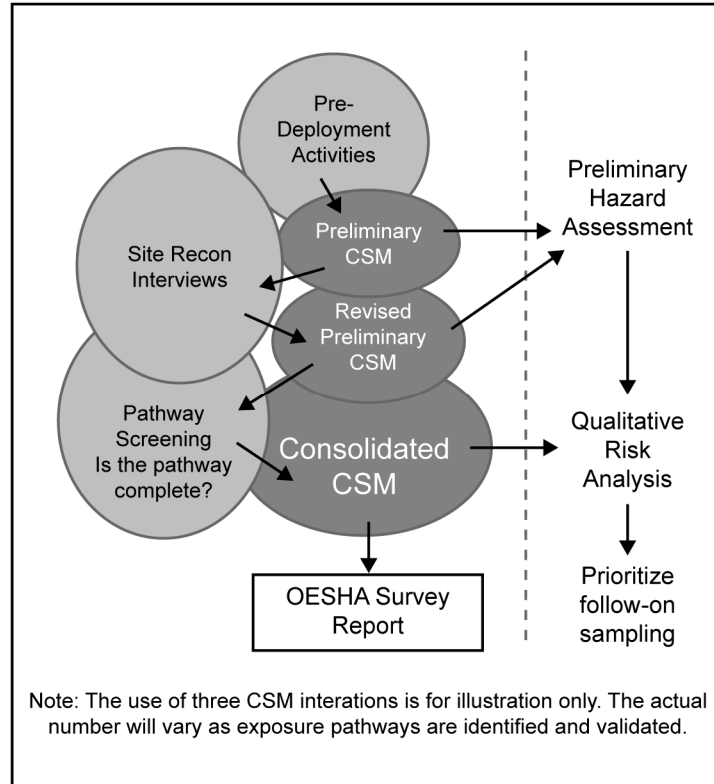


Figure 1-2. Conceptual Site Model Evolution

Deployed Site Setting	PHASE I	PHASE II			
	Predeployment Activities	Step 1 Interviews and Recon		Step 2 Pathway Screening	Step 3 Conceptual Site Model
		On-site	Off-site		
Potential Operating Location (no infrastructure and no population at risk (PAR))	<p>Use, concept of operations, operational plans, unit/operational environmental engineer and intelligence assets or other predeployment planning documents to begin to collect data needs for CSM development, including population characteristics, operational activities, deployment schedules, and other mission specific information that may impact who will be deployed, what they will be doing, how long they will be there, etc.</p> <p>Predeployment activities might be limited to open source internet search and contacting the United States Air Force School of Aerospace medicine (USAFSAM), National Center for Medical Intelligence (NCMI), United States Army Public Health Command (USAPHC), etc.</p> <p>Focus efforts to identify potential regional-specific threat sources such as ambient conditions, typical industries, known endemic/vector-borne diseases, etc.</p> <p>Preliminary CSM should be a goal, but might be limited due to insufficient information.</p>	<p>Interview other team members, construction crews, and host nation liaison to determine potential cantonment and work areas.</p> <p>Recon to verify OEH threat sources identified during Phase I and discover new potential OEH threat sources. Limited recon off-site depending on force protection security conditions, walk/drive perimeter to identify site boundaries and potential off-site OEH threat sources.</p>	<p>Overcome cultural, political, and language barriers. Off-site recon is preferably done airborne. If off-site recon is prohibited for security reasons, brief and de-brief security teams that go "outside the wire."</p> <p>Walk/drive the perimeter to identify site boundaries and potential off-site OEH threat sources.</p>	<p>Verify OEH threat sources identified during Phase I and discover new potential OEH threat sources.</p> <p>Use direct reading/field portable analytical instruments for site screening.</p>	<p>Build CSM estimating populations affected based on OEH threat sources in the JS OEHSA template.</p> <p>Document OEH threat source locations for future reference in OEHSA report.</p>
New Operating Location (with infrastructure)	<p>Interview personnel identified in figure 3-1, host nation liaison, and others to determine where people will be located (cantonment and work areas).</p> <p>Identify new construction activities.</p> <p>Perform interviews and recon to validate OEH threats on preliminary CSM and identify any new OEH threat sources.</p>	<p>Identify complete/potentially complete exposure pathways.</p> <p>Perform pathway screening with direct reading/field portable analytical instruments (preferred method), professional judgment, obvious physical evidence at the exposure point area, historical circumstance, etc.</p>	<p>Consolidate all exposure pathways identified in the JS OEHSA template that have been determined to be complete or potentially complete to build CSM.</p> <p>Perform a qualitative risk ranking using probability and severity tables and the risk management matrix.</p> <p>Prioritize the CSM exposure pathways for follow-on sampling.</p> <p>Write the OEHSA report.</p>		

Figure 1-3. Occupational and Environmental Health Site Assessment Activity Matrix (Sheet 1 of 2)

Deployed Site Setting	PHASE I	PHASE II			
	Predeployment Activities	Step 1 Interviews and Recon		Step 2 Pathway Screening	Step 3 Conceptual Site Model
		On-site	Off-site		
Operating Location	<p>Discuss the OEHSA with preventive medicine predecessor and unit/operational environmental engineer assets and obtain copies of documents (e.g., environmental baseline study (EBS), environmental compliance report, occupational health workplace exposure data, environmental and occupational health workplace exposure data (EOHWED), POEMS, toxic industrial chemical/toxic industrial material vulnerability assessments, water vulnerability assessment, and OEH SAP).</p> <p>Conduct open source internet search and consult NCMI, USAPHC, global threat assessment program (GTAP), United Nations environmental program (UNEP), International Atomic Energy Agency (IAEA), and SECRET Internet Protocol Router Network (SIPRNET) resources. Search for previous assessment and sampling data in the DOEHRS and the MESL.</p> <p>Develop a preliminary CSM.</p>				
<p>Notes:</p> <ol style="list-style-type: none"> 1. Service preventive medicine personnel will fill out the JS OEHSA template during Phase I and II of the OEHSA process. 2. Health risk communication to local commanders, medical authority, etc., is accomplished throughout the OEHSA process as new OEH threat information is ascertained. 					

Figure 1-3. Occupational and Environmental Health Site Assessment Activity Matrix (Sheet 2 of 2)

CHAPTER 2

Occupational and Environmental Health Site Assessment Phase I: Predeployment Activities

2.1 GENERAL

The purpose of Phase I of the OEHSA process is for Service preventive medicine personnel to identify as much information as possible concerning potential OEH threats associated with the military deployment location before arrival on site. During these predeployment activities, Service preventive medicine personnel should begin completing the JS OEHSA template, developing a preliminary CSM, and formulating a PLHA and courses of action to take upon arrival at the deployed location.

2.2 PREDEPLOYMENT ACTIVITIES

The primary objective of the predeployment activities is to conduct a PLHA and build a preliminary CSM for the deployment site. Service preventive medicine personnel should make a substantial effort to identify as many of the potential OEH threats associated with on- and off-site sources prior to deploying to a location. This is the beginning of the OEHSA process and the initial stages of building a CSM. It can be reasonably expected that existing OEH information may be limited, depending on current or past operations conducted at the location. However, an extensive search to obtain general information concerning the location should be accomplished. The list provided below identifies some typical questions that Service preventive medicine personnel should answer during predeployment activities. The amount of lead time available prior to the deployment will largely affect the amount of information that can be obtained. During this process, the JS OEHSA template should be used as a guide to collect information. Appendix A provides a brief description of the data captured on the JS OEHSA template. Keep in mind that available information may be descriptive of the country or region only and not specific to the deployed site itself. Nevertheless, Service preventive medicine personnel should make an effort to complete as much of the JS OEHSA template as possible during this phase.

1. Are there U.S. personnel already present at the deployed location? How many? (If there are no personnel currently on-site, the scope of the OEHSA will change to identifying any OEH threat sources at the site and allow Service preventive medicine personnel to make recommendations concerning site layout to minimize exposure potential to existing OEH threats.)
2. What is the primary mission of the site? (Provide insight into the following: weapon systems present or planned, industrial workplaces present or planned, and OEH threats associated with these operations.)
3. What are the primary activities performed on the location? Will there be specific at risk populations as a result of these activities?
4. What types of geography, topography, and/or meteorological conditions are associated with the site (urban/rural area, temperature range, predominant wind direction, etc.)?
5. What are the agricultural or industrial operations adjacent to the site? (Obtain information on typical OEH threats from these operations and confirm appropriate screening capability on-site.)
6. What types of structures are on the site (temporary/permanent structures, types of housing, etc.)?

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7. How will these structures be used during the current mission? What were the prior uses of these structures? Are intended uses compatible with prior uses?
8. What is the historical use of the land prior to current site development and use? (Provides insight to possible soil contamination; e.g., agricultural, industrial.)
9. Are there other water sources (above/below ground) on or near the site that may be utilized for purposes other than drinking water, i.e., sewage lagoons, cooling ponds for industrial uses, irrigation ditches, live stock watering holes, etc.? Are there potential health hazards associated with those water sources, i.e., agricultural runoff containing pesticides and fertilizers, animal/human waste, industrial discharges into the water source that may contain heavy metals, etc.? What are the drinking water sources? How is the distribution system set-up? (Identify typical drinking water sources and possible health risks to common water contaminants in country.)
10. What is the security posture of the environment near the location? (An environment with active insurgents/terrorists could increase the likelihood of drinking water contamination and/or toxic industrial chemical release.)

Information sources. Since the most useful information may be reachable only on classified networks, the first step is to locate a SIPRNET at the home station, submit a visit request and begin research of the deployed location. Ask for guidance on applicable SIPRNET Web addresses from the appropriate Service component surgeon's office or the combatant commander for the deployed site.

Service preventive medicine personnel should contact the following organizations during their predeployment research and provide them sufficient lead time to effectively respond to the request:

National Center for Medical Intelligence (NCMI)¹

Web: <https://www.intelink.gov/ncmi/index.php> from any.mil or.gov computer account

SIPRNET: <https://www.ncmi.dia.smil.mil> from a SIPRNET account

NCMI Operations Center (24 hours/7 days)

DSN: 343-7574 Com: 301-619-7574

e-mail: NCMIOPS@ncmi.detrick.army.mil or NCMIOPS@ncmi.dia.smil.mil

Army Institute of Public Health, Global Threat Assessment Program (GTAP)

Web: <http://phc.amedd.army.mil/organization/institute/dhrm/Pages/GlobalThreatAssessmentProgram.aspx>

DSN: 584-3177 Com: (410) 436-3177

e-mail: phc-gtap@amedd.army.mil

SIPRNET: <https://phc.army.smil.mil/Pages/GlobalThreatAssessment.aspx>.

NMCI and GTAP maintain medical intelligence information on countries around the world that may include disease and environmental health (EH) risks, current industries in the surrounding area, and details on land utilization which may support the area of interest. GTAP also incorporates any historical knowledge/data about a specific location and provides recommendations. This information will help identify sources of OEH threats, which can be researched through traditional means (Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Agency for Toxic Substances and Disease Registry (ATSDR), UNEP, IAEA, Patty's Toxicology, Toxicology Data Network, Wireless Information System for Emergency Responders, etc.). There are numerous references that refer to the medical, environmental, disease, intelligence, and countermeasures (MEDIC) compact disc read-only memory (CD-ROM) as a potential source of information.

¹ The Armed Forces Medical Intelligence Center (AFMIC) was formally re-designated as the National Center for Medical Intelligence (NCMI) in July 2008.

However, the MEDIC CD-ROM no longer exists. All information that was on the MEDIC CD-ROM is now available on the NCMI Web site. Typical data available from NCMI and GTAP includes:

1. maps, topographic and geological information relevant to the deployment area
2. historical and current property use of the site such as the type of agricultural, industrial, institutional, commercial, and/or residential uses
3. known hazardous waste sites
4. known contamination and pollution in air, water, and soil media
5. typical climate conditions including normal and extreme temperatures, seasonal precipitation, and seasonal prevailing wind directions and velocities
6. known property use including type of infrastructure such as existing buildings, transportation networks, water treatment and distribution systems, wastewater collection and treatment systems, and known power generation and transmission systems.

Other potential sources of OEH threat information concerning deployed locations are the MESL at <https://mesl.apgea.army.mil/mesl/>, the classified Occupational and Environmental Health Surveillance (OEHS) data portal at <https://doehsportal.csd.disa.smil.mil/doehrs-oehs/>, and the Defense Occupational and Environmental Health Readiness System at <https://doehrs-ih.csd.disa.mil/>. These portals allow Service preventive medicine personnel the ability to search, view, and download classified or unclassified OEHS documents and exposure summaries from various deployed locations. In addition, a library of Phase I assessments completed by the USAPHC, OEHSAs, and POEMSs are located at <https://phc.army.smil.mil> via the SIPRNET.

The following centers may provide additional OEH threat data based on the sources identified from NCMI or internet searches.

DOD

Armed Forces Pest Management Board

Web: <http://www.afpmb.org/>

Com: (301) 295-7476 Fax: (301) 295-7473

AIR FORCE

United States Air Force School of Aerospace Medicine (USAFSAM)

Web: <https://kx.afms.mil/kxweb/dotmil/kj.do?functionalArea=ESOH>

Environmental, Safety, and Occupational Health (ESOH) Service Center

DSN: 798-3764 Com: (888) 232-3764

e-mail: <mailto:esoh.service.center@wpafb.af.mil>

ARMY

U.S. Army Institute of Public Health (AIPH)²

Web: <http://phc.amedd.army.mil/ORGANIZATION/INSTITUTE/Pages/default.aspx>

DSN: (312) 584-8717 Com: (410) 436-8717

e-mail: phc-desp-request@amedd.army.mil

Army Public Health Command—Europe

Web: <http://www.chppmeur.healthcare.hqusareur.army.mil/>

DSN: (314) 486-8084 Com: +49-6371-86-8084

e-mail: Not Available

² United States Army Center for Health Promotion and Preventive Medicine (USACHPPM) and U.S. Army Veterinary Command (VETCOM) were combined in October 2009 to form the U.S. Army Public Health Command. The U.S. Army Public Health Command reached full operational capability on 1 October 2011.

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Army Public Health Command–Pacific
DSN: (315) 263-8447 Com: 011-81-46-407-8447
e-mail: PHCR-Pacific-CMD@amedd.army.mil

NAVY
U.S. Navy and Marine Corps Public Health Center (NMCPHC)³
Web: <http://www.nmcphc.med.navy.mil/>
Expeditionary Preventive Medicine Department
DSN: 377-0694 Com: (757) 953-0694
e-mail: <mailto:epm@nehc.mar.med.navy.mil>

Navy Environmental and Preventive Medicine Unit 2
Web: <http://www.med.navy.mil/sites/nepmu2/Pages/default.aspx>
DSN: 377-6600 Com: (757) 953-6600
e-mail: NEPMU2NorfolkThreatAssessment@med.navy.mil

Navy Environmental and Preventive Medicine Unit 5
Web: <http://www.med.navy.mil/sites/nmcsd/nepmu5/Pages/index.htm>
DSN: 526-7070 Com: (619) 556-7070
e-mail: <mailto:nepmu5@med.navy.mil>

Navy Environmental and Preventive Medicine Unit 6
Web: <http://www.med.navy.mil/sites/nmcsd/nepmu6/Pages/index.html>
DSN: (315) 471-0237 Com: (808) 471-0237
e-mail: <mailto:nepmu6admin@med.navy.mil>

Below are additional sources of information that may be obtained from one of the organizations above or through the Service combatant command (COCOM) Surgeons office.

EOHWED summaries and/or POEMS⁴ data: These documents are environmental exposure data summaries created for a deployment location, for a specified time period, normally 6 months or 1 year. These reports provide the potential OEH exposures to deployed personnel at a particular deployment location for a specified period of time.

Occupational and environmental health exposure document (OEHED): OEHEDs contain deployed exposure summaries for each industrial workplace or similar exposure group to include the type of workplace and the associated occupational health (OH) exposures at the deployed location. These documents identify the industrial shops located at a particular deployment location, as well as, OH exposure documentation.

Environmental baseline studies (EBSs) provide an excellent source of background and land use data to help Service preventive medicine personnel identify potential OEH threat sources. The EBS determines the potential for present and past site contamination by hazardous substances, petroleum products, and derivatives, as well as, contaminants (e.g., lead, copper, and pesticides (above and below ground)) in drinking water, asbestos-containing materials, PCBs, radioactive material, or lead-based paint. An EBS should have been done initially for all sites.

After action reports document what was accomplished by the predecessor, lessons learned, and potential OEH threat issues that need to be addressed by the next rotation of Service preventive medicine personnel.

Google Earth and similar open source satellite mapping tools contain surprisingly accurate overhead visual layouts of most geographic areas. These mapping tools can aid in identifying potential sources of EH threats (e.g., large industry, major emission sources, lakes, lagoons) surrounding the deployed site. Figure 2-1 provides an example of a Google Earth visual layout of Balad Air Base, Iraq. The program has a more refined resolution as

³ The Navy Environmental Health Center (NEHC) was renamed the Navy and Marine Corps Public Health Center (NMCPHC) in November 2007.

⁴ In 2010 the EOHWED summaries were replaced with POEMS.

you zoom in to an area of the base. This image gives Service preventive medicine personnel a visual of the base before arrival, allowing the assessor to start formulating a site reconnaissance approach. In addition, the AIPH GTAP can produce geographic information system-based maps upon request.

Data on the prevailing wind is another critical piece of information that Service preventive medicine personnel need to aid in identifying potential exposure pathways. Wind direction and speed play a pivotal role in the migration of OEH threats. Information on prevailing winds can be obtained from NCMI, the internet, or local weather sources (e.g., the supporting meteorological detachment or weather squadron). A wind rose shows how wind speed and direction are typically distributed at a particular site. Presented in a circular format, as in figure 2-2, the wind rose shows the frequency of winds blowing from a particular direction. The wind rose may not be available for every military deployment location. In which case, Service preventive medicine personnel may use wind information from a nearby airfield or airport as representative data for the site. However, the greater the distance this information source is from the site, the less accurate it may be in representing site-specific characteristics.

Service preventive medicine personnel should begin completing the JS OEHSA template with information acquired through research of the sources listed earlier in chapter 2. The extent of the research will be directly related to the amount of lead time available prior to the deployment. The development of a preliminary CSM is the typical deliverable associated with predeployment activities. Based on the information found, Service preventive medicine personnel should begin to formulate a PLHA and courses of action needed soon after arrival at the deployed location, such as prioritizing site reconnaissance and interviews to address the more important OEH threats first (e.g., specific threat or source located upwind of cantonment areas). Typically, there is not enough information or confidence in the information to draw specific health risk conclusions during this phase to present to a commander. More information likely will have to be collected during the next phase of the OEHSA process.

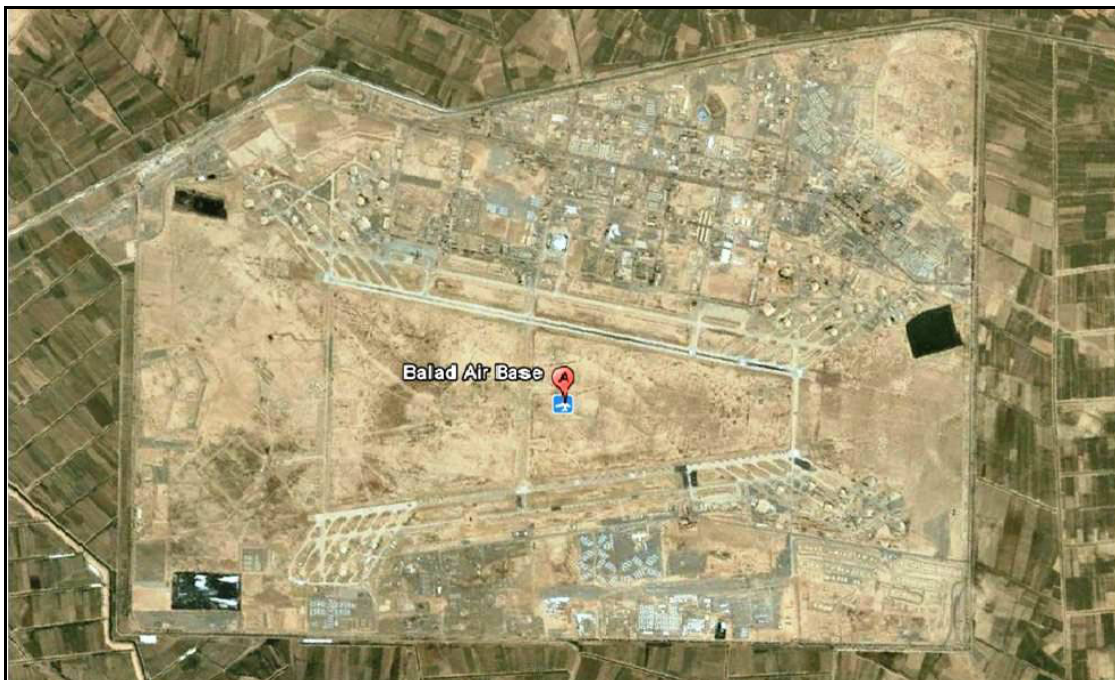


Figure 2-1. Google Earth Visual Layout of Balad Air Base, Iraq⁵

⁵ Image obtained using Google Earth.

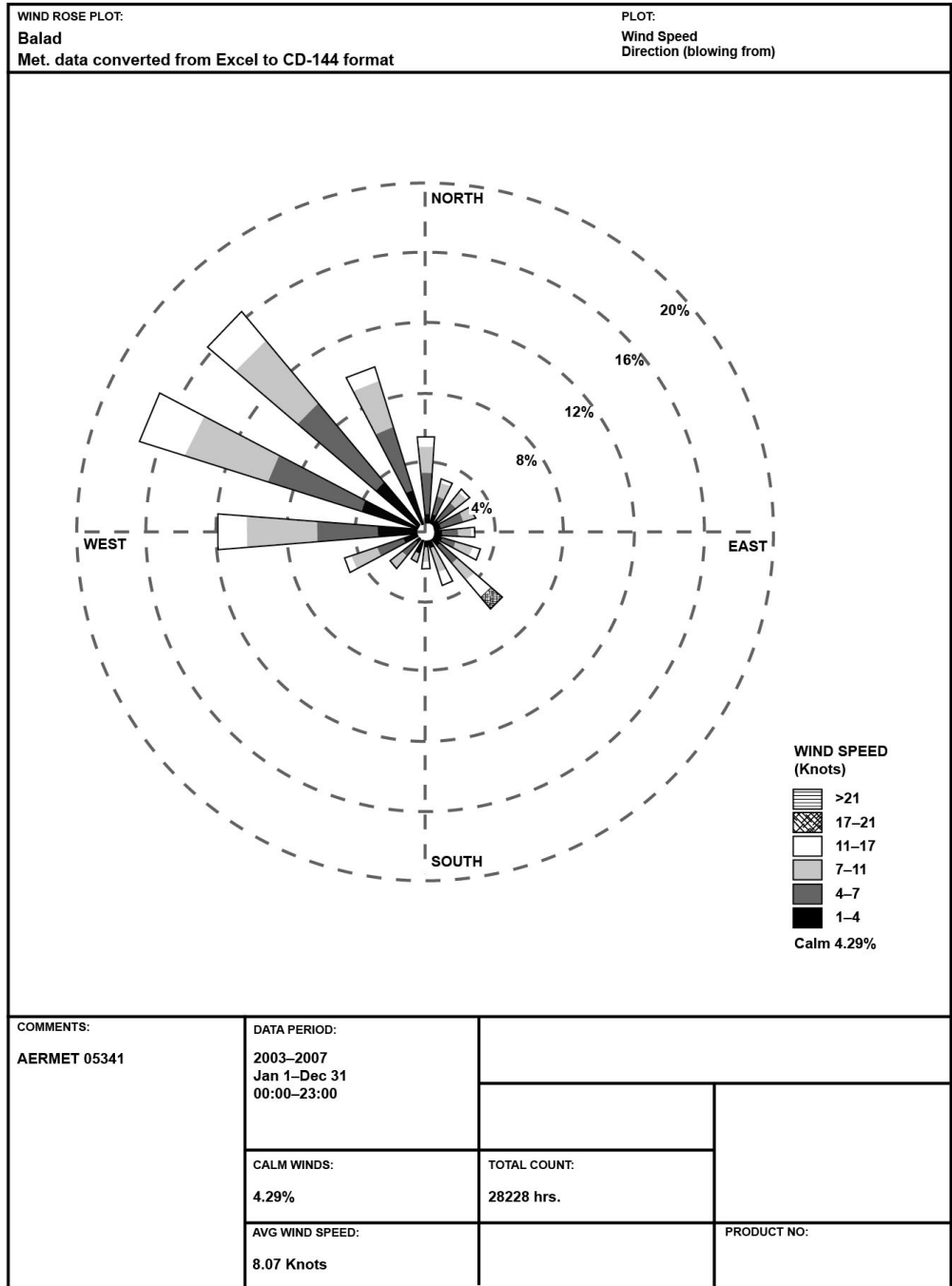


Figure 2-2. Balad Airbase Wind Rose

CHAPTER 3

Occupational and Environmental Health Site Assessment Phase II: Deployment Activities

3.1 GENERAL

During this phase of the OEHSA process, Service preventive medicine personnel will build upon the information (e.g., preliminary CSM and PLHA) ascertained from Phase I by performing interviews, site reconnaissance, and pathway screenings using direct reading instruments and/or professional judgment. Furthermore, Service preventive medicine personnel will perform qualitative risk ranking on complete and potentially complete exposure pathways, build the consolidated CSM, and produce the OEHSA report for the site. The completion of Phase II meets MCM 0028-07 and Department of Defense instruction (DODI) 6490.03 requirements for an OEHSA.

Immediately upon arrival at the deployed location, the lead Service preventive medicine person should engage with the local commander or chain of command on the following:

1. OEHSA requirements and procedures
2. Planned activities and support needed
 - a. Site reconnaissance/interviews on- and off-site
 - b. Areas to visit
3. Pre-identified OEH threat sources (based on data from predeployment activities)
4. OEHSA timelines:
 - a. Out-brief of visit to include immediate recommendations
 - b. Development of the CSM and initiate sampling activities
 - c. OEHSA report.

Service preventive medicine personnel should continuously communicate with the chain of command throughout the OEHSA process on findings and potential health risks as they are identified. Upon completion of Phase II, an OEHSA report can be generated from data obtained and validated during site reconnaissance and interviews, and site/pathway screening using direct reading instruments and/or professional judgment. An example OEHSA report is provided in appendix B.

3.2 SITE INTERVIEWS AND RECONNAISSANCE

Site interviews and reconnaissance will allow Service preventive medicine personnel to: identify/validate OEH threats on the deployment location, identify potential exposure pathways of a particular source, and determine if exposure pathways are complete via pathway screening. The primary objective of interviews and reconnaissance

is to identify and visually verify the existing occupational and environmental conditions at the site that could negatively impact the health of personnel. Site reconnaissance and interviews allow Service preventive medicine personnel to cultivate what was learned in Phase I, generate more detailed information, and identify other potential sources of OEH threats.

OEHSA information and data can become classified. Service preventive medicine personnel must be aware of what data or information can cause the OEHSA to become classified (e.g., vulnerabilities, recording grid coordinates, including maps of the site, and photographs of potential high interest facilities). Service preventive medicine personnel should consult with appropriate agencies and follow Service specific guidance and procedures for classification and distribution.

3.2.1 On-Site/Off-Site Interviews

Service preventive medicine personnel should conduct interviews with personnel who are familiar with the deployed location and its historical land use. Interviews are necessary to obtain site information that may not have been previously available and/or to validate previously collected information identified in the JS OEHSA template. Interviews should be conducted before reconnaissance, and can be continued during and after reconnaissance to clarify information on potential sources of OEH threats. Credible, knowledgeable individuals may be on hand for established locations; however, these individuals may not be readily available for a site without existing infrastructure. Figure 3-1 lists organizations/personnel from which Service preventive medicine personnel can gain valuable information required to complete the JS OEHSA template.

Interviews with host nation liaisons may provide a wealth of information pertaining to local or surrounding industries or sources of OEH threats at the site, and may provide insight on historical land use.

Template Section	Air Force Sites	Navy/Marine Corps Sites	Army Sites	All Sites
Site description	Civil engineering (CE) operations; CE asset management; weather squadron; security forces; Office of Special Investigations; fire department	Theater force health protection officer (TFHPO); FOB operations officer; combat engineer/Navy construction battalion personnel	Army Corps of Engineers (COE); directorate of public works (DPW); engineering services division; engineering assets; military police; base intelligence office; base logistics office; preventive medicine detachment, preventive medicine assets	Host nation liaison
Site infrastructure	Bioenvironmental engineering (BEE); CE operations; CE power production; force support squadron; fire department	TFHPO; organic preventive medicine; FOB operations officer	DPW; COE; directorate of logistics (DOL); preventive medicine detachment; preventive medicine assets; base operations/intelligence offices; base logistics office; engineering assets	Industrial shop supervisors; contracting office
Hazardous materials (HAZMAT)	CE operations; CE asset management; logistics readiness squadron; fuels management; HAZMAT pharmacy; fire department; BEE	TFHPO; unit HAZMAT operator; HAZMAT coordinator; unit safety officer/representative	DPW; base fire department; safety office; DOL; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Fire department; industrial shop supervisors; radiation safety officer

Figure 3-1. Joint Service Occupational and Environmental Health Site Assessment Template Interview Points of Contact (Sheet 1 of 2)

Template Section	Air Force Sites	Navy/Marine Corps Sites	Army Sites	All Sites
Waste management	CE asset management; hazardous/solid waste program manager	TFPHO; hazardous/solid waste manager; organic preventive medicine—environmental health officer (EHO)/preventive medicine technician; expeditionary medical facility (EMF) preventive medicine	DPW; solid waste center; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	
Entomology	Pest management shop; public health	Organic preventive medicine—entomologist/preventive medicine technician; TFPHO officer; pest management shop; EMF preventive medicine	DPW; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Host nation medical liaison
Physical hazards	BEE; CE asset management; site frequency manager; veterinary detachment	FOB safety office; force health protection officer; veterinary detachment	DPW; safety office; veterinary detachment; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Radiation safety officer
Air quality	CE asset management; BEE; air emission program manager	TFHPO; FOB safety office; mobile construction battalion	DPW; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Host nation liaison
Water	BEE; CE operations; CE utilities; water treatment plant operator	TFHPO; Marine Corps water engineers; water treatment plant management; organic preventive medicine—EHO/preventive medicine technician; EMF preventive medicine	DPW; water treatment plant supervisor; veterinary detachment; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Host nation liaison; host nation water treatment plant operators
General/food sanitation	Public health; force support squadron	Marine Corps galley supervisor/watch captains; organic preventive medicine—EHO/preventive medicine technician; EMF preventive medicine	DOL; DPW; Army/Air Force exchange service; veterinary detachment; base logistics office; engineering assets; preventive medicine detachments; preventive medicine assets	Host nation food vendors; facility managers

Figure 3-1. Joint Service Occupational and Environmental Health Site Assessment Template Interview Points of Contact (Sheet 2 of 2)

3.2.2 On-Site/Off-Site Reconnaissance

Service preventive medicine personnel should request that personnel who have historical knowledge of the site and other subject matter experts from the organizations providing base operating support (see figure 3-1) participate in the on-site reconnaissance. The major objectives of reconnaissance are to identify and verify existing occupational and environmental conditions at the site or adjacent to the site that could impact the health of personnel. Furthermore, Service preventive medicine personnel should be on the lookout for industrial operations that are conducted “inside and “outside the wire” of the deployed site. If, in the professional judgment of the lead preventive medicine professional, the OEH threats associated with these operations may pose an immediate health threat, actions should be taken to preclude or avoid major OEH exposures.

One of the first steps to site reconnaissance is to obtain a current map of the area (e.g., aerial or satellite photographs), if one is available. Obtaining on-site and off-site maps to support site reconnaissance is vital. Photographs also provide excellent documentation. Obtain approval prior to taking photographs and OEH samples, if necessary, and be careful not to include photographs that may change the classification of the OEHSAs. All photographs must have a good description depicting the context of the photo (e.g., this picture depicts the burn pit from the closest occupied work center, 250 meters SSW of the pit). When conducting reconnaissance, Service preventive medicine personnel should focus on potential OEH threats identified in the preliminary CSM, cantonment areas, and/or primary work locations. However, the site reconnaissance should span every area of the site and around the site “outside the wire” in order to identify additional OEH threat sources. Service preventive medicine personnel should consider using direct reading instruments (DRIs) while performing reconnaissance on and off site to identify any unknown OEH threats (e.g., alarming radiation dosimeters for potential radiation sources, sound level meter, multi-gas detectors, etc.). As part of the site reconnaissance, all buildings and industrial areas should be systematically visited.

Service preventive medicine personnel shall drive or walk the inside perimeter of the site to identify the boundaries of the site, recording the military grid reference system (MGRS) coordinates for the corners, and estimating the total area occupied by the site. The site reconnaissance must be extensive enough to identify all outfalls or potential incoming sources of pollution that may affect personnel living and working on the site. The list below outlines some key items, areas, and hazard sources that Service preventive medicine personnel must look for and describe during site reconnaissance. The majority of these are covered in the JS OEHSAs template.

1. Building’s exterior/interior conditions
2. Storage tanks
3. Pits, ponds, or lagoons
4. Current use (adjacent properties)
5. Pools of liquid
6. Stained soil
7. Geologic, hydrologic, topographic
8. Drums
9. Stressed vegetation
10. Type of roads
11. Unidentified containers
12. Ambient air conditions

13. Signage indicating hazardous material use/storage areas
14. Water source
15. Wastewater and storm water disposal methods.

Site perimeter reconnaissance provides an opportunity to identify potential off-site industrial operations that could impact site operations. Service preventive medicine personnel will need to overcome the traditionally challenging task of identifying significant off-site industrial operations that may pose a potential health threat to site personnel. As a minimum, any major industrial operations within five miles should be identified on the JS OEHSA template. Service preventive medicine personnel should follow any Service specific guidance that dictates otherwise. Depending on force protection conditions, restrictions may prohibit traveling “outside the wire” to conduct interviews and reconnaissance. If this is the case, an interview with other agencies that regularly travel outside the site (e.g., security forces personnel) may provide information on significant off-site sources and threats. Aerial reconnaissance also would be a method of identifying OEH threat sources within the five mile radius around the site.

Site reconnaissance includes entering/describing existing buildings/structures and identifying all key on-site industrial operations (e.g., maintenance and transportation), existing controls, and the frequency/duration these operations are performed. Industrial shops and potentially hazardous processes should be added to the JS OEHSA template if not already documented and tracked in the DOEHS-industrial hygiene. Service preventive medicine personnel should observe all higher risk operations or processes to determine whether or not these processes have the potential to affect another population outside the work center.

In the case of bare site operations when no pre-existing infrastructure is present, complete an initial site reconnaissance prior to determining the site layout. If the OEHSA represents the first preventive medicine team visit to the site, responsibilities may include recommending ideal cantonment and work locations for the site to eliminate or mitigate potential exposure pathways. Temporary locations for sleeping and eating quarters, work locations, etc., may need to be quickly identified with the understanding that relocation may be necessary based on OEHSA findings and associated HRAs. In this situation, coordination should be made to reassess the site once the camp is established, preferably within 30 days, in order to determine additional potential exposure pathways relevant to site configuration and operations.

The collection of site OEH threat data through site interviews and reconnaissance facilitates the completion of the JS OEHSA template. Service preventive medicine personnel must identify all complete or potentially complete exposure pathways for known OEH threats. Determining whether exposure pathways are complete is accomplished to the extent practical through direct observation of operations (professional judgment) and pathway screening with direct reading/field portable analytical instruments.

3.3 PATHWAY SCREENING

The primary objective of pathway screening is to answer the question, “Is the exposure pathway complete or not?” A secondary objective is to identify exposure pathways that may become complete at some future point in time and under what conditions this could occur. Service preventive medicine personnel apply qualitative and quantitative measures to answer these questions. Pathway screening, within the limitations of available equipment and/or knowledge of specific on- and off-site industrial processes, can confirm which exposure pathways are complete and must be added to the final CSM. Site interviews and reconnaissance, screening potential exposure points with DRIs, and estimating the preliminary health risk can be accomplished simultaneously for each exposure pathway. However, time constraints and equipment availability may limit the ability of the Service preventive medicine personnel to confirm pathway completion or to investigate all exposure points (or locations). Service preventive medicine personnel must ensure exposure pathways and exposure point locations that have not been evaluated for completion are added to the final CSM to drive further data collection.

The results of the pathway screening supports initial prioritization of follow-on, more in-depth sampling and analysis activities in support of developing a health risk assessment. Furthermore, pathway screening results will enable Service preventive medicine personnel to perform a qualitative risk ranking to determine if immediate

protective actions are needed and to address any immediate operational risks associated with the OEH threats (e.g., site layout recommendations) for the site.

During pathway screening, if a direct reading instrument measurement is “high” (defined as a concentration above a pre-specified level; e.g., the lowest short-term negligible military exposure guideline (MEG)) at a known exposure point, immediate actions should be taken to initially control the exposure (e.g., move the PAR/source, suspend the process, implement administrative controls, provide personal protective equipment).

Direct reading instruments are the most definitive method, but other methods (physical evidence, interviews, etc.) are just as valuable and should be used to refine which DRIs to use. Before taking direct readings, preventive medicine personnel have to determine if the source, pathway, and receptor are all present or potentially present. Relying on initial findings in a Phase I CSM/ PHLA may lead to unnecessary sampling or misleading results (e.g., sampling a well that is no longer used as a water source). Finally, professional judgment is critical to ensuring DRIs are used correctly (e.g., don’t select a DRI with a limit of detection in the parts per million (ppm) range when the chemical of concern’s (COC) health threshold is in parts per billion (ppb)). Figure 3-2 outlines the decision logic for pathway screening using direct reading instruments. The “Basic Characterization” in figure 3-2 will be addressed later in section 4-2 and figure 4-1.

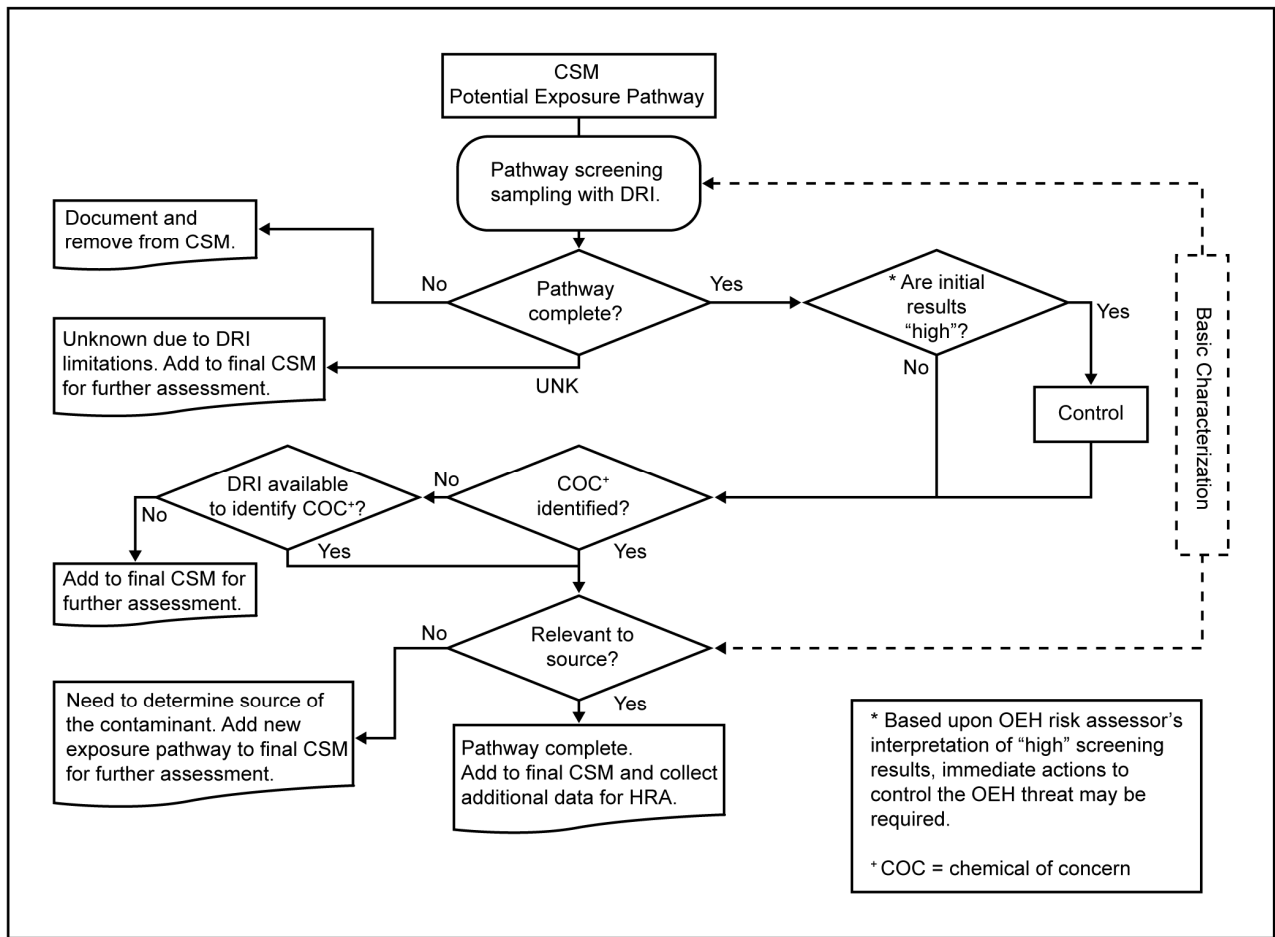


Figure 3-2. Decision Logic for Pathway Screening using Direct Reading Instruments

The ability to confirm pathway completion in the field is largely dictated by each Service's field analytical capability. This capability is dependent upon screening equipment, training, analytical methods, the environmental media, and interferences and the site's environmental conditions. It is critical that Service preventive medicine personnel be able to discern and communicate the goals, application, and inherent limitations of pathway screening. Service preventive medicine personnel should choose a conservative approach to ensure pathway screening is biased to achieve a high probability of detection (e.g., worst case scenario). Poor pathway screening could lead to incorrect conclusions regarding the exposure pathway. This, in turn, could result in unacceptable exposures to site personnel and/or have a negative impact on mission accomplishment.

In the absence of existing infrastructure, the initial preventive medicine team should focus on existing sources for OEH threats to facilitate permanent site layout and build-up. Usually during this particular scenario, the primary PAR consists of advanced echelon and construction teams. If direct reading instruments are available, pathway screening results should be used to drive preferred cantonment and work locations for the site to eliminate or mitigate potentially complete exposure pathways.

Pathway screening results and conclusions should be documented in the appropriate section of the JS OEHSA template. If direct reading instruments are used, pathway screening must be documented as follows:

1. OEH threat source
2. Sample date and time
3. Location sampled (e.g., MGRS coordinates and site sketch)
4. Media sampled
5. Analytes
6. Screening results, including units of measurement
7. Instrumentation used, calibration records, serial number, and results
8. Environmental conditions (i.e., temperature, humidity, etc.).

Any exposure pathways that are considered incomplete by either pathway screening or professional judgment may be excluded from the CSM. The rationale and method of determining that an exposure pathway is incomplete also must be documented in the appropriate section of the JS OEHSA template. As mentioned previously, site reconnaissance and interviews, pathway screening, and estimating the preliminary health risk will likely be accomplished simultaneously. However, deployment time constraints and equipment availability may limit the ability of Service preventive medicine personnel to perform pathway screening on all potentially complete exposure pathways. Service preventive medicine personnel must address in the consolidated CSM all potentially complete exposure pathways that have not been ruled out. Exposure pathways that have been deemed complete or potentially complete are used to build the OEH SAP, addressed in chapter 4.

3.4 BUILD CONSOLIDATED CONCEPTUAL SITE MODEL

Service preventive medicine personnel must consolidate all exposure pathways identified in the JS OEHSA template that are determined to be complete or potentially complete to build the CSM. Specific exposure pathways, (e.g., source, environmental medium, health threat, route of exposure, and population affected), and additional information such as existing controls and frequency/duration must be included in the CSM. Figure 3-3 provides an example of a CSM showing four notional exposure pathways. Each row represents a single, distinct exposure pathway. The column on the right represents the residual risk after existing control measures.

Preventive medicine personnel accomplish qualitative risk ranking of complete exposure pathways based on the information gathered during site reconnaissance and pathway screening (e.g., discolored soil, visible smoke cloud, and elevated pathway screening results). Service preventive medicine personnel will estimate risk using the guidance in figure 3-4 to determine severity and probability and the risk assessment matrix in figure 3-5 to prioritize exposure pathways for further evaluation. Figure 3-4 provides Service preventive medicine personnel general guidance on assigning the appropriate severity and probability for an exposure pathway. This guidance is based on risk assessment principles described in DODI 6055.1 (Aug1998), DOD Safety and Occupational Health (SOH) Program.

The key to using the risk management matrix guidance is to have a consistent and separate approach to probability and severity. Probability and severity help determine exposure pathway priority. The risk management

Elements of an Exposure Pathway						Obtained Through Interviews/ Reconnaissance	Risk Estimate for Prioritization of Exposure Pathways		
Source	Environmental Medium	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/ Duration	Severity	Probability	Risk
Desert environment	Air	Particle matter (PM) ₁₀ PM _{2.5}	Inhalation	All site personnel	None	24 hours/day 7 days/week	Marginal	Frequent	High
Power plant	Air	PAHs	Inhalation	All site personnel	None	24 hours/day 7 days/week	Marginal	Likely	Moderate
Power plant	Soil	Heavy metals PAHs	Inhalation Ingestion	All site personnel	None	Situational during patrols, 4–8hrs/day 7 days per week	Marginal	Occasional	Moderate
Agricultural run-off	Water	Pesticides Heavy metals	Ingestion	All site personnel	Water treatment	7 days/week 5L/day consumption	Critical	Likely	High

Figure 3-3. Example of a Conceptual Site Model

Severity Potential impact on personnel and mission	Probability How often the event is expected to occur
Cantonment areas and other higher priority facilities (e.g. air operations center, command post) impacted	Continuous versus intermittent exposure expectations
Pathway screening results > acute occupational and environmental exposure limits (OEEL) or action level or guideline levels (sign of potential acute, immediate health concern)	Number of personnel potentially exposed
Pathway screening results > chronic OEEL or action level or guideline (sign of potential long-term/ permanent health concern)	Frequency and duration of potential contact during any given day/week
Subjective subject matter expert knowledge/ experience of specific hazards	Potential association of exposures with known medical complaints
Observable/noticeable contamination present	Frequency and duration of potential contact with existing contamination

Figure 3-4. Guidance for Determining Severity and Probability for Qualitative Risk Ranking of Exposure Pathways⁶

⁶ Adapted from DODI 6055.1 (Aug1998), DOD Safety and Occupational Health (SOH) Program.

HAZARD SEVERITY	HAZARD PROBABILITY				
	Frequent (A)	Likely (B)	Occasional (C)	Seldom (D)	Unlikely (E)
Catastrophic (I)	Extremely High	Extremely High	High	High	Moderate
Critical (II)	Extremely High	High	High	Moderate	Low
Marginal (III)	High	Moderate	Moderate	Low	Low
Negligible (IV)	Moderate	Low	Low	Low	Low

Figure 3-5. Risk Assessment Matrix

process is the best method to quickly prioritize the exposure pathways on the CSM. This information should be provided to the local chain of command. Since OEH risk management is an iterative process, this facilitates the decision makers' ability to prioritize health risk evaluations and control options. The qualitative risk ranking using the risk management process is a tool for Service preventive medicine personnel to assist with deciding which exposure pathways should be assessed first. This prioritization will help focus resources to evaluate higher risk OEH threats that have an immediate impact on the operational mission or the health of site personnel. Other factors may affect the prioritization such as operational risks, cantonment area location determination, and equipment availability.

3.5 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT REPORT

By fully completing the JS OEHS template during Phase II of the OEHS process, Service preventive medicine personnel will capture all the necessary data to develop the OEHS report. Development of the report is largely impacted by whether or not Service preventive medicine personnel have access to the DOEHS or not. The following URL provides directions and links for obtaining a DOEHS account: http://phc.amedd.army.mil/topics/envirohealth/hrasm/Pages/DOEHS_Information.aspx or <https://doehrs-ih.csd.disa.mil/Doehrs>. No classified OEHS information or data should be entered into the DOEHS. Any information that could cause an OEHS report to be classified should be submitted separately via the classified OEHS data portal at <https://mesl.csd.disa.mil/mesl> or follow Service specific guidance on reporting and distribution of classified OEHS data.

3.5.1 Service Preventive Medicine Personnel with Access to Defense Occupational and Environmental Health Readiness System

Service preventive medicine personnel shall input all the data captured with the JS OEHS template into the DOEHS OEHS. Once all the data are entered into the DOEHS, the DOEHS OEHS report should be reviewed and approved by the OEHS approving official. The OEHS approving official should be the senior on-site preventive medicine professional or a higher echelon preventive medicine professional designated by the joint task force (JTF) or Service component theater policies, such as the Command Surgeon's FHP officer. Once the DOEHS OEHS report is approved, all data entered into the DOEHS OEHS report and all samples/surveys/reports attached to the survey, will become a time-specific permanent record. The DOEHS OEHS report can then be generated (hardcopy or electronically) from the DOEHS.

3.5.2 Service Preventive Medicine Personnel without Access to Defense Occupational and Environmental Health Readiness System

Service preventive medicine personnel without DOEHS access will have to generate the OEHS report manually. The completed JS OEHS template will be the primary OEHS information used to generate the report. Contact the appropriate Service's OEH surveillance center (i.e., AIPH, NMCPHC, or USAFSAM) for assistance. Service preventive medicine personnel must ensure the report includes the following: an executive summary identifying significant OEH threats that have potential to affect one or more populations living/working on-site; the operational mission and recommended courses of action; a prioritized consolidated CSM; a preliminary hazard assessment based on qualitative risk ranking for each complete or potentially complete

exposure pathway; any limitations of the assessment due to time and operational mission constraints; and a summary of results of pathway screening that may have been accomplished. The report should be reviewed and approved by a senior preventive medicine professional on-site or a higher echelon preventive medicine professional designated by the JTF or Service component theater policies, such as the command surgeon's FHP officer.

3.5.3 Peer Review

Before submitting the OEHSA report through the chain of command, Service preventive medicine personnel should seek a peer review of the report through technical channels from Service preventive medicine personnel on the JTF and Service component Command Surgeon staff. Once approved, the OEHSA report must be routed to the deployment site medical authority and local operational commander. Furthermore, the OEHSA report should be sent to the JTF Surgeon and COCOM Surgeon in accordance with theater policies and DODI 6490.03, Table E4.T4. If the OEHSA was not entered directly into the DOEHRS, submit the peer-reviewed OEHSA report to the MESL and notify the appropriate Service's deployed OEH surveillance center (i.e., AIPH, NMCPHC, or USAFSAM). Submit the OEHSA report to the MESL by sending it to oehs.data@us.army.mil or oehs@usachppm.army.smil.mil depending on its classification.

Upon completion of the OEHSA report, the requirement for conducting an initial OEHSA at a particular site per MCM 0028-07 and DODI 6490.03, Table E4.T2 has been met.

CHAPTER 4

Occupational and Environmental Health Site Assessment Phase III: Additional Data Collection

4.1 GENERAL

The iterative nature of the OEHSA process may require multi-phased, multi-deployment, or multi-year evaluation periods to thoroughly assess all OEH threats and to fully characterize health risks. The primary objective of this phase is to collect environmental data to accurately characterize health risks associated with the OEH threats identified in the previous phases, update the current CSM as new data and hazards are identified, establish long term sampling plans, and continually support health risk management for the particular deployment location and time. The initial Service preventive medicine personnel should develop a comprehensive site OEH SAP to address the final CSM. Follow-on Service preventive medicine assets will validate the original CSM, look for new exposure pathways, build upon the data collected, continue to execute the site OEH SAP, and file a revised OEHSA report. This process should be repeated at least annually or sooner if information about the particular site indicates a significant change in mission or population or concerns about specific OEH threats emerge.

4.2 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SAMPLING

For Service preventive medicine personnel to be able to characterize health risks associated with exposure pathways, they must build and execute a comprehensive, defensible site OEH SAP. The site OEH SAP is a consolidation of individual exposure pathway sampling strategies. Service preventive medicine personnel should develop a sampling strategy for each complete or potentially complete exposure pathway on the CSM and incorporate the strategy into the OEH SAP. The objective of the sampling is to obtain the right type, quality, and quantity of sampling data to characterize OEH risks.

Service preventive medicine personnel must develop a defensible OEH SAP to properly characterize potential exposures to OEH threats for the various sub-populations at a site to support health risk assessment. Furthermore, personal sampling accomplished as part of the OEH SAP supports the longitudinal exposure record for the individual sampled. The level of detail in the OEH SAP will depend on the nature of the deployment site and mission (e.g., site source identification for bare site operations versus fully operational sites with multiple populations that are at risk of exposure). The OEH SAP should be dynamic and evolve as new data are ascertained and as the deployment mission evolves. It is critical that the OEH SAP capture all sampling and analytical procedures to be performed for each complete or potentially complete exposure pathway identified on the CSM. OEH sampling will most likely be performed across multiple deployment phases, by multiple preventive medicine assets, for a year or more to fully characterize exposure point concentrations for OEH threats. For continuity purposes, the OEH SAP must describe all sampling activities and include the following information, at a minimum, for each exposure pathway identified in the CSM:

1. Media to be sampled (air, soil, water, food, disease vectors)
2. Sampling approach (judgment, systematic random, etc.)
3. Number of samples
4. Type of samples (discrete, composite, environmental, personal, quality assurance [duplicate, blank] background, etc.) and the underlying assumptions that justify the sample type

5. Sampling locations and an explanation why/how those locations were selected and what potentially each location represents (e.g., exposure point, background) (indicate locations on a map, site sketch, MGRS coordinates, etc.)
6. Duration of sampling and interval between samples (if multiple) with explanation of why duration and interval were chosen
7. Analytical methodologies (field analytical tools versus reach-back laboratory analysis) and target analytes
8. Sampling equipment (including capabilities and limitations of equipment)
9. Sample preservation techniques
10. Equipment decontamination procedures.

Arguably, the OEH SAP is the most critical document of the OEHSA process because it bridges all information discovered about OEH threats on the site, allowing Service preventive medicine personnel to effectively assess the health risks associated with them. Service preventive medicine personnel should, as much as is practical, use industry standards for developing sampling strategies such as the Department of Defense industrial hygiene (DODIH) exposure assessment process and the EPA data quality objective (DQO) process. The sampling strategies help Service preventive medicine personnel ensure they collect sufficient quantity and quality of the right type of data to support health risk assessment for all populations at risk.

Conceptually, the OEHSA process fits the standard American Industrial Hygiene Association (AIHA) exposure assessment strategy (see figure 4-1) for both occupational and environmental exposures. The DOD has adopted a modified version of this industry standard called the DODIH Exposure Assessment Model (see figure 4-2). This modification adapts the AIHA strategy to conform to the military decision-making process and incorporates language specific to DOD systems. The basic characterization of the exposure assessment strategy was completed by accomplishing Phase I and II of the OEHSA process. The goal of the “exposure assessment” stage in the AIHA process is to determine if the OEH risks associated with exposures are acceptable or not, or if further information is required to be able to make that decision. Nevertheless, all exposure levels whether acceptable, unacceptable, or uncertain must be documented accordingly.

Furthermore, the OEH sampling strategy should be based upon the principles of the DQO. The DQO process is simple and well recognized to ensure data collection is accomplished appropriately, with reason and relevance, and ensures the right type, quantity, and quality of data are collected for decisionmaking. The “decision” is what drives the DQOs. The DQO process includes seven steps that define the sampling strategy (see figure 4-3). For each complete or potentially complete exposure pathway on the CSM, Service preventive medicine personnel should develop a sampling strategy incorporating the steps outlined in figure 4-2.

Service preventive medicine personnel will be required to make decisions as to the best sampling approach to assess an exposure pathway. The objective is to develop the most resource-effective sampling strategy that will provide the assessor and key decision maker with enough confidence to make health risk decisions. Performing site reconnaissance to validate the exposure pathways on the CSM provides Service preventive medicine personnel direct visibility on the nature of the OEH threat, inherent variability of the environmental medium and information on the various PARs. The site OEH SAP should capture all the decision points and explain why the approach was chosen. The environmental medium through which an OEH threat migrates to an exposure point and the variability of the medium will drive or influence sampling methodologies, equipment, and procedures to assess the potential OEH threat risk. The information contained in figures 4-3 through 4-5 should, as a minimum, be included in the SAP for all samples collected.

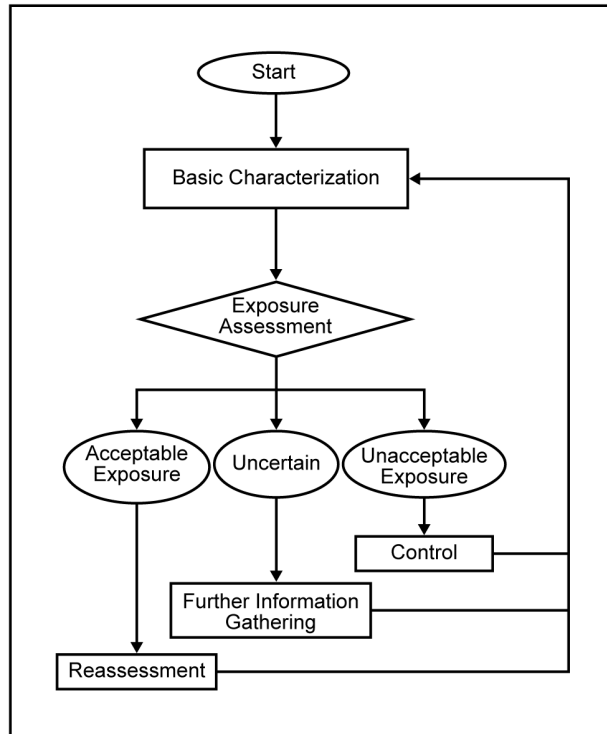


Figure 4-1. American Industrial Hygiene Agency Exposure Assessment Strategy⁷

⁷ Adapted from “A Strategy for Assessing and Managing Occupational Exposures,” Third Addition, American Industrial Hygiene Association, 2006.

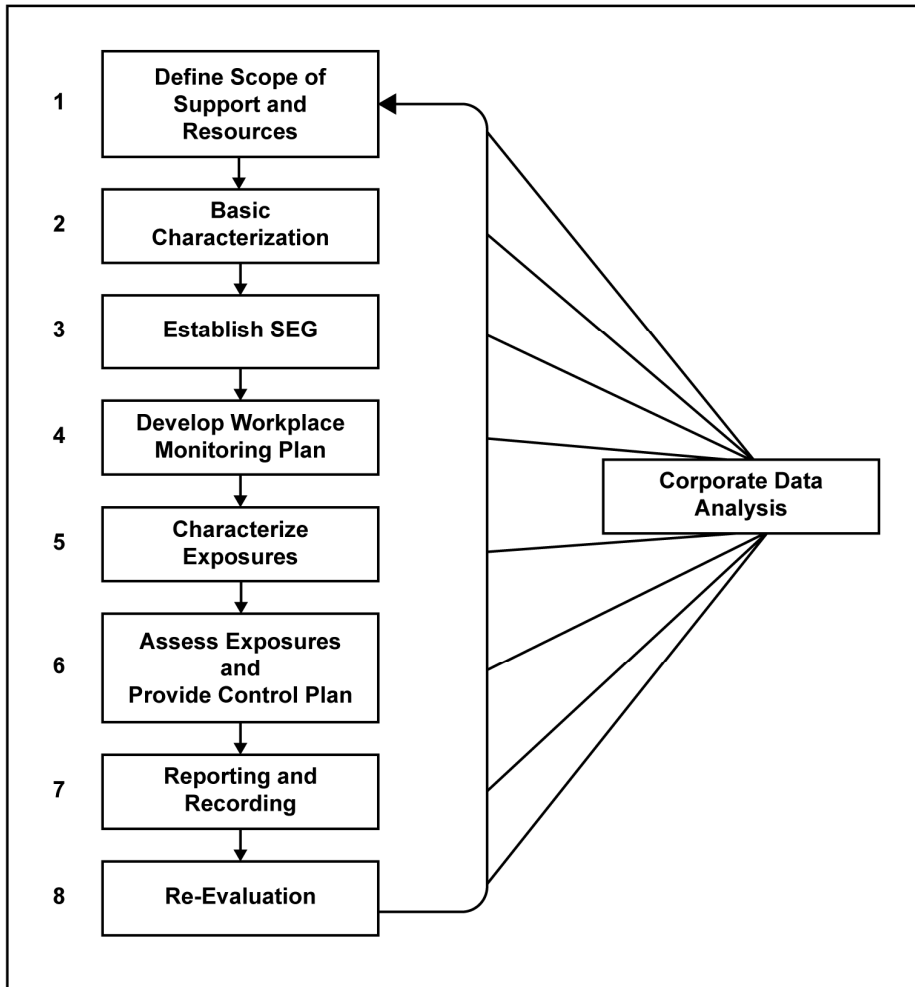


Figure 4-2. Department of Defense Industrial Hygiene Exposure Assessment Model

Data Quality Objectives Process	
DQO Step	Specific Questions/Factors
<p>Step 1—State the problem: A complete or potentially complete exposure pathway exists for an OEH threat source to one or more populations at a site.</p>	<p>What is the reason for exposure assessment sampling? Clearly identify the health risks associated with the exposure pathway.</p>
<p>Step 2—Identify the decision or goal: A clear decision must be established to determine why further data analysis or collection is needed. Service preventive medicine personnel must identify and assess the health risks associated with known or suspected OEH threats.</p>	<p>Does the OEH threat pose an acute or latent health risk to the PAR? Do exposures pose an acceptable or unacceptable risk? Bare site operations: Are there OEH threats on-site? What impact do the OEH threats have on the mission?</p>
<p>Step 3—Identify information inputs to the decision: Use interviews, site reconnaissance, and observations to determine the types of sampling needed. Establish appropriate sampling locations, methods, and equipment.</p>	<p>Where and how do you take the samples to assess exposure point concentrations? Defined by the exposure pathway: OEH threat source (landfill, surface water, hazardous material storage, industrial facilities, etc.) Environmental media (soil, air, and water) Routes of exposure (inhalation, ingestion, absorption, and contact) Population affected (representative exposure points for PARs). Factors to consider: Identify methods and needed sampling equipment Method and instrument capabilities and limitations. Field portable equipment should be used and supplemented with laboratory reachback analysis</p>
<p>Step 4—Define the boundaries: Define the exposed populations, the sampling units (number of samples, segments, sub-locations), the physical boundaries from which a representative exposure point is determined and the smallest sampling unit on which a decision will be made.</p>	<p>How many samples are needed? When are samples taken? What are the boundaries of the exposure area? Are the conditions heterogeneous or homogenous? What is the smallest number of samples that decisions will be based upon? Factors to consider: Time and resource constraints on data collection Military operational factors (sorties, convoy deployments, etc.) Mission objectives may impose restrictions (force protection conditions) Industrial operations (shift work, 24 hour operations, etc.) Meteorological conditions (temperature, humidity, wind, etc.) Spatial boundaries (geographic limitations, obstacles, etc.) Smallest sampling unit (1 sample versus 20 samples).</p>

Figure 4-3. The Data Quality Objectives Process (Sheet 1 of 2)

Data Quality Objectives Process (continued)	
DQO Step	Specific Questions/Factors
<p>Step 5—Develop the decision rules/analytical approach: Identify target action levels, how data will be used to characterize OEH threat levels, and the action that will be taken, if levels are exceeded.</p>	<p>What OEELs will be used?</p> <p>What options for risk mitigation are available if OEELs are exceeded? Example: move cantonment area, use bottled water as drinking water source, additional monitoring, etc.</p> <p>Factors to consider:</p> <ul style="list-style-type: none"> Established OEELs (MEGs, OSHA permissible exposure limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values, EPA, and ATSDR limits), governing regulations, mission/personnel criticality, etc.
<p>Step 6—Determine performance or acceptance criteria: Defines “how good” the data needs to be for decisionmaking.</p>	<p>What is the desired confidence level* in the sampling results to drive the decision?</p> <p>Factors to consider:</p> <ul style="list-style-type: none"> Environmental variability Field versus laboratory environment Method sampling and analytical error Speed by which a decision needs to be made (Determining cantonment areas, work locations, etc.).
<p>Step 7—Develop the detailed sampling plan: Finalizes the number of samples and sampling locations</p>	<p>Are the number of samples and sampling locations based on the factors considered in Step 6?</p> <p>Does the number of samples achieve the desired confidence level?</p>
<p>* Desired confidence level is based on Service preventive medicine personnel’s professional judgment that quality and quantity of the sampling data are adequate and pertinent to the decision trying to be made (e.g., take actions to mitigate or control the OEH threats, determine more in-depth exposure assessment sampling).</p>	

Figure 4-3. The Data Quality Objectives Process (Sheet 2 of 2)

Environmental Medium: Soil	
Sampling	Analysis
<p>What is the objective of soil sampling?</p> <p>What is the most appropriate sampling approach and why?</p> <p>Example: judgmental, random, stratified random, systematic grid, etc.</p> <p>What is the appropriate number of samples and how was this number determined?⁸ Media variability and confidence level required to make the decision impacts the number of samples needed.</p>	<p>What are the anticipated COCs/analytes relevant to the OEH threat source?</p> <p>Example: volatile organic compounds (VOCs) from hazardous waste landfill, metals from atmospheric deposition from a smelting industrial facility.</p> <p>What are the appropriate OEELs for comparison?</p> <p>Example: 1 year soil MEG, EPA default soil risk screening levels.</p>
<p>What method was used to identify sampling locations?</p> <p>Example: compass, MGRS coordinates, pacing, measuring tape.</p> <p>At what depth will soil samples be taken?</p> <p>Example: surface versus subsurface.</p> <p>What field screening will be accomplished during sampling?</p> <p>Example: X-ray fluorescence (XRF), photoionization detector/flame ionization detector, HAPSITE headspace, ADM300.</p> <p>What type of sampling will be accomplished and what is the underlying assumption that drives this decision?</p> <p>Example: discrete vs. composite.</p> <p>What sample collection tools are needed to collect the samples?</p> <p>Example: trowel/scoop, coring device, auger.</p> <p>What quality assurance (QA)/quality control (QC) procedures will be implemented during sampling?</p> <p>Example: trip blanks, duplicate samples, equipment decontamination procedures, sample preservation techniques, appropriate clean sample containers/ volume for analytical method, sample heterogeneity.</p> <p>For radiological sampling, the numbers and types of radiological background samples to be taken.</p>	<p>What is the appropriate analytical method to achieve the desired limit of detection?</p> <p>What laboratory will the samples be sent to and has coordination been done ahead of time to determine appropriate analytical method?</p>

Figure 4-4. Information Required for a Sampling and Analysis Plan for Soil

⁸ USACHPPM Technical Guide 317, NMCPHC TM-PM 6490.2, and Bioenvironmental Engineering Field Manual provide specific guidance on the appropriate number of samples.

Environmental Medium: Air	
Sampling	Analysis
<p>What is the objective of air sampling? Example: ambient concentrations/conditions, identify COCs and concentrations from known OEH threat sources, acute/chronic assessment.</p> <p>What type of samples will be collected? Example: ambient or personal.</p> <p>When should samples be taken? (Consider climatic changes from temporal variations when deciding when to take samples.) Example: night/day, seasons, etc.</p>	<p>What are the anticipated COCs/analytes relevant to the OEH threat source? Example: VOCs from hazardous waste landfill, metals from fugitive emission from a smelting industrial facility, ambient PM from desert conditions.</p> <p>What are the appropriate OEELs for comparison? Example: MEGs, OSHA PELs, ACGIH threshold limit values</p> <p>Example: polyurethane foam, XAD, cellulose fiber filter.</p> <p>What laboratory will the samples be sent to and has coordination been done ahead of time to determine appropriate analytical method?</p>
<p>What is the appropriate number of samples? (Consider media variability due to meteorological conditions, terrain, site size, etc., and confidence level required to achieve the objective impact the number of samples needed.)</p> <p>What is the time period and frequency for the samples to be collected? What is the rationale for that time period/frequency? Example: 24 hours, industrial operation process time.</p> <p>Where will the samples be collected? Example: exposure point areas, tent city, work locations, MGRS coordinates.</p> <p>What equipment will be used to collect the samples? Example: deployable particulate sampler (DPS), personal air sampling pumps, HAPSITE.</p> <p>What field screening will be accomplished during sampling? Example: XRF, photoionization detector/flame ionization detector, HAPSITE, ADM300.</p> <p>For radiological sampling, the numbers and types of radiological background samples to be taken.</p> <p>What QA/QC procedures will be implemented during sampling? Example: blanks, pre/post equipment calibration.</p>	<p>What is the appropriate analytical method and collection media to achieve the desired limit of detection?</p>

Figure 4-5. Information Required for a Sampling and Analysis Plan for Air

Environmental Medium: Water	
Sampling	Analysis
<p>What is the objective of the water sampling? Example: source selection, OEH threat source assessment, verification of the treatment process.</p> <p>What type of samples will be collected? Example: drinking water, nondrinking water uses, personal hygiene, cooking, etc.</p> <p>Where will the samples be taken? Example: before/after treatment, closed loop, water buffalo.</p> <p>What are the primary COCs? Example: bacteriological, chemical, radiological.</p> <p>What field screening will be accomplished during sampling? Example: HAPSITE headspace, conductivity meter, pH/chlorine, HACH water test kit.</p>	<p>What are the anticipated COCs/analytes relevant to the OEH threat source? Example: VOCs from hazardous waste landfill, pesticides from agriculture run-off.</p> <p>What are the appropriate OEELs for comparison? Example: MEGs, EPA maximum containment level, Nuclear Regulatory Commission annual limits on intake and derived air concentrations.</p> <p>What is the appropriate analytical method to achieve the desired limit of detection?</p> <p>What laboratory will the samples be sent to and has coordination been done ahead of time to determine appropriate analytical method?</p>
<p>What QA/QC procedures will be implemented during sampling? Example: blanks, spiked positive samples.</p>	

Figure 4-6. Information Required for a Sampling and Analysis Plan for Water

There are numerous environmental sampling references such as AIPH (formerly USACHPPM) technical guide (TG) 317 (Feb2009), Technical Guide for Collection of Environmental Sampling Data Related to Environmental Health Site Assessments for Military Deployments, technical manual (TM)-preventive medicine 6490.2 (Dec2008), Technical Guide for Collection of Environmental Sampling Data Related to Environmental Health Site Assessments for Military Deployments, the USAF Bioenvironmental Engineering (BEE) Field Manual, and EPA guidance that can assist Service preventive medicine personnel in developing a sound OEH SAP. When developing an OEH SAP, the decision or the objective will drive the sampling strategy. Service preventive medicine personnel should seek guidance either from Service preventive medicine personnel on the JTF and Service component command surgeon staff or Service’s deployed OEH surveillance centers when developing the OEH SAP.

When executing the OEH SAP, Service preventive medicine personnel should capture conditions associated with the sampling event that can help build confidence in the data. Physical observations such as wind direction, stressed vegetation, and discolored soil during the sampling event provides essential information as to whether or not a sampling result is representative of a potential exposure. These observations and any field notes must be captured and recorded with the sampling results and uploaded into the DOEHRS or the MESL (see chapter 5) and reported in accordance with (IAW) the Service’s theater policies. This is critical data when assessing the potential health risks associated with an OEH threat.

As mentioned previously, environmental/personal sampling most likely will be executed across multiple deployments by multiple preventive medicine teams. Service preventive medicine personnel must continually update the OEHS report while collecting sampling data, assessing exposure results, performing health risk assessment, and reporting OEH findings, results, and control recommendations up the chain of command. As sampling data are collected and interpreted and confidence grows in the characterization of exposure point concentrations, Service preventive medicine personnel should continue to update the risk-based prioritization for the exposure pathways on the CSM to ensure preventive medicine resources are focused on higher risk OEH threats on the site.

NTRP 4-02.9/AFTTP 3-2.82_IP /ATP 4-02.82

The primary objective of performing environmental sampling is to accurately characterize health risk to deployed populations and when personal sampling is performed, data obtained supports documentation in that Service members' longitudinal exposure record. This is the goal for which Service preventive medicine personnel should strive. Developing and executing a comprehensive site OEH SAP is an essential step for Service preventive medicine personnel to be able to achieve this goal. The importance of performing sound OEH sampling to drive operational decisions and support health risk assessments cannot be stressed enough. All sampling data, health risk assessment conclusions and decisions shall be uploaded into the DOEHRS or the MESL and reported IAW the Service's theater policies.

CHAPTER 5

Occupational and Environmental Health Site Assessment Phase IV: Occupational And Environmental Health Risk Assessment

OEH data management is ongoing throughout the OEHSA process and across multiple deployments by multiple rotations of preventive medicine personnel. OEH data management for a particular site begins with the OEHSA report. The first Service preventive medicine team should document the initial OEHSA in the DOEHRS and each rotation of preventive medicine personnel thereafter should continue to update the OEHSA. As a minimum, the OEHSA should be updated annually during which time supporting preventive medicine personnel should validate that the existing CSM is still current, identify new exposure pathways and new OEH threat sources, categorize pathways that have been fully characterized as “no further action required” and exclude them from future updates, continue to fill data gaps by executing the SAP and revise the SAP based on new information. As OEH sampling and surveillance data are obtained and interpreted, Service preventive medicine personnel must continually communicate health risk information to local commanders, command surgeons, health care providers, and military personnel. This information should include results from HRAs and recommendations to mitigate health risks using appropriate risk communication language that is consistent with the confidence level of the data.

As Service preventive medicine personnel continually collect data and perform HRAs at a deployed location, any occupational and environmental monitoring and sampling results and health risk assessments must be documented in accordance with the Service theater policies. Any information that has not been uploaded into the DOEHRS must be submitted via the MESL, <https://mesl.apgea.army.mil/mesl/>.

The MESL is an online repository administered by the USAPHC for archiving and providing access to deployed OEH surveillance data. It is not a part of the DOEHRS and does not interface with the DOEHRS. Service preventive medicine personnel without access to the DOEHRS should upload all OEH surveillance and health risk documentation for their deployed location. All the OEH surveillance and risk documentation for a deployed location should be reviewed by the JTF or Service component FHP officer to build the POEMS for their deployed location in the MESL. This is usually conducted with assistance from the Service’s deployed OEH surveillance centers (i.e., AIPH, NMCPHC, and USAFSAM) by reviewing the data in the DOEHRS and/or the MESL.

The POEMSs are the official DOD-approved documents that summarize population health risks and the potential medical implications associated with major deployment sites (e.g., base camps). Specifically, POEMSs describe the types of potential health threats (e.g., airborne pollutants, water pollutants, infectious disease, noise, heat/cold), summarize data/information collected, and provide an assessment of the significance of any known or potential short-term (during deployment) and long-term (post deployment) health risk to the population deployed to the site.

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The POEMSs are developed to address the requirements of DODI 6490.03 and 6055.05 (Nov 2008), Occupational and Environmental Health (OEH), and MCM 0028-07. The POEMS replaces the requirement to prepare “periodic occupational and environmental monitoring summaries on a standard form (SF) 600 for each permanent or semi-permanent basing location.” POEMSs are to be created and validated/updated for every major deployment site as soon as sufficient data are available, but no later than one year after the site is established. In general, POEMSs should reflect data and information collected over a year or more in order to adequately evaluate potential risks from long-term exposures at a site. Specifically, POEMSs are the results of the OEHSA process and limited by the OEH SAP developed to characterize each exposure pathway identified in the consolidated CSM. POEMSs should be reevaluated as data indicate exposure conditions have changed. Appendix D contains an example POEMS.

To ensure the POEMSs are true representations of a deployed location’s OEH conditions and health risks for a specific site, Service preventive medicine personnel must continue to execute the comprehensive OEH SAP, document health risk assessments, and update the OEHSA information in the DOEHRS (or upload the information into the MESL if the DOEHRS access is not available) during their deployment.

APPENDIX A

Joint Service: Occupational and Environmental Health Site Assessment Template

The OEHSA provides a comprehensive assessment of both occupational and environmental health threats associated with a deployment location (e.g., permanent or semi-permanent site location) and the activities and missions that occur there. The JS OEHSA template is the OEHSA data/information collection tool used to identify all OEH threats and to build a comprehensive CSM for a particular deployed location. The template can be found at the following Web link: <https://mesl.apgea.army.mil/mesl/doehrsResources/initialize.do>. Figure A-1 describes the 21 sections of the OEHSA template.

OEH Threat Categories	Data Description
1. Administrative data	Basic site information (e.g., location name, geographic coordinates, units assigned, camp population)
2. Survey background	OEHSA mission scope, purpose, methodology, and limitations/assumptions
3. Site description	Site physical characteristics, meteorological data, water sources, soil types, proposed site usage, current/past uses of the property/adjacent property, and nearby industrial facilities
4. Site infrastructure	Existing on-site industrial operations, description of structures/roads and power generation and any contractor services
5. Hazardous materials	Hazardous material storage (above/below ground), petroleum distribution points, past/ present releases, evidence of spill containment/mitigation practices, and disposal methods
6. Waste management	Solid/hazardous waste management to include landfills, burn pits, incinerators, and wastewater management
7. Entomology	Disease threats, vectors present, and pest control measures in place
8. Physical hazards	Physical hazard sources (e.g., ionizing and non-ionizing radiation sources and environmental noise sources present)
9. Air quality	Ambient air quality and indoor air quality sources
10. Water	Water sources (e.g., municipal, bottled, ground or surface, water treatment and distribution systems, and water surveillance)

Figure A-1. Occupational and Environmental Health Threat Categories Covered under the Joint Service Occupational and Environmental Health Site Assessment Template (Sheet 1 of 2)

OEH Threat Categories	Data Description
11. General sanitation	General facilities
12. Food sanitation	Dining facilities
13. Personnel contacted	List of points of contact for each category
14. Other EH concerns	Captures OEH threats not captured in any of the other categories
15. CSM	Consolidated CSM for all categories
16. On-site screening results	Pathway screening sampling/limited exposure assessment sampling results
17. DRIs and associated calibration	Equipment inventory for any sampling performed during recon
18. Executive summary findings	Detailed environmental conditions of health/mission significance
19. Executive summary recommendations	Health risk communication to local command
20. Reviewed and communicated to command	Documents the reviewer of the assessment and information pertaining to providing the assessment results to the site command
21. Samples collected for off-site analysis	Specific sample taken for lab analysis

Figure A-1. Occupational and Environmental Health Threat Categories Covered under the Joint Service Occupational and Environmental Health Site Assessment Template (Sheet 2 of 2)

APPENDIX B

Example Occupational and Environmental Health Threat Scenario and Sampling and Analysis Plan

B.1 OCCUPATIONAL AND ENVIRONMENTAL HEALTH THREAT SCENARIO

A Service preventive medicine team was tasked to perform an OEHSA at a potential FOB to determine whether or not OEH conditions at the site pose a potential health risk. There is limited infrastructure on the site. The site is approximately 6 acres in size on mostly flat land and surrounded by a security fence. During the execution of the OEHSA, the Service preventive medicine team identified an OEH threat source, a coal burning power plant located upwind and 1 km west of the site, that potentially may pose an acute or chronic health risk to future site personnel. Based on site reconnaissance and interviews, Service preventive medicine personnel have determined that a complete exposure pathway exists for power plant emissions and that environmental sampling should be accomplished to determine the potential health risks at the site.

B.2 CONCEPTUAL SITE MODEL

The CRM for the scenario discussed in paragraph B.1 is displayed in figure B-1.

Source	Environ Media	Health Threat	Route of Exposure	Population Affected	Existing Controls	Frequency/ Duration	Severity	Probability	Risk
Coal-burning thermal power plant	Air	Heavy metals, PM ₁₀ and PM _{2.5} , PAHs, sulfur dioxide (SO ₂)	Inhalation	Site personnel	None	7 days/ week 24 hours/ day	Marginal	Occasional	Moderate
Coal-burning thermal power plant	Soil	Heavy metals, PAHs	Inhalation, ingestion, dermal	Site personnel	None	7 days/ week 24 hours/ day	Marginal	Seldom	Low

Figure B-1. Conceptual Site Model

B.3 OCCUPATIONAL AND ENVIRONMENTAL HEALTH SAMPLING AND ANALYSIS PLAN

The following sampling and analysis plan was developed to support assessment of the completed exposure pathways identified in the CSM.

Overall Sampling Objective: To measure ambient air and soil concentrations for the COCs at representative exposure points to determine whether or not measured levels exceed applicable OEELs and pose a potential acute and/or chronic health risk to future site personnel.

OEELs: MEGs are appropriate OEELs for the OEH threats identified in the CSM above. All sample results will be compared to the appropriate MEGs.

B.3.1 Ambient Air: Sampling and Analytical Method(s)

Assumptions: The power plant is the only known source of pollution in the immediate area other than normal ambient conditions. Airborne COC concentrations will be highly variable and dependent on meteorological and atmospheric conditions. All environmental samples will be sent to USAPHC laboratory except for sulfur dioxide. Sulfur dioxide sampling will be completed via a direct reading instrument and results recorded into the site field data log (see figure B-2).

B.3.2 Soil: Sampling and Analytical Method(s)

Soil sampling and analytical methods for the scenario in paragraph B.1 are depicted in figure B-3.

B.3.3 Occupational and Environmental Health Sampling and Analysis Plan Site Map

An OEH SAP site map for the scenario in paragraph B.1 is shown in figure B-4.

OEH Threat	Sampling Equipment and Media	Analysis Method*	Sampling Rate	Sampling Duration	Sampling Frequency
PM _{2.5}	DPS with 47 millimeters (mm) quartz filters	Gravimetric	10 liters per minute	24 hours	Daily
PM ₁₀	DPS with 47 mm quartz filters	Gravimetric	10 liters per minute	24 hours	Daily
<p>Rationale: Monitor for 14 consecutive days to determine typical ambient air exposure concentrations associated with the normal ambient conditions and emissions from the coal power plant.</p> <p>Procedures: Place one DPS at the central location identified by the geospatial coordinates identified below and one DPS at the boundary location identified by the geospatial coordinates identified below. Sampling at each location will be accomplished at approximately 4 to 6 feet above ground level to account for the breathing zone. Samplers will be placed at a distance of at least twice the height from any on-site/off-site obstruction (buildings, trees, etc.), to mitigate boundary layer effects. Filters will be changed-out every 24 hours.</p>					
Heavy metals	DPS with 47 mm polytetrafluoroethylene filters	IO-3.4	10 liters per minute	24 hours	Daily
<p>Rationale: Daily monitoring for 14 days to determine typical ambient air exposure concentrations associated with normal ambient conditions and fugitive emissions from the coal power plant.</p> <p>Procedures: Place one DPS at the central location identified by the geospatial coordinates identified below and one DPS at the boundary location identified by the geospatial coordinates identified below. Sampling at each location will be accomplished at approximately 4 to 6 feet above the ground level to account for the breathing zone. Samplers will be placed at a distance of at least twice the height from any on-site/off-site obstruction (buildings, trees, etc.), to mitigate boundary layer effects. Filters will be changed-out every 8 hours.</p>					
PAHs	Deployable cartridge sampler (DCS) with XAD cartridge	EPA TO-13a	10 liters per minute	24 hours	Daily
<p>Rationale: Monitor for 14 consecutive days to determine typical ambient air exposure concentrations associated with the normal ambient conditions and fugitive emissions from the coal power plant.</p> <p>Procedures: Place one DCS at the central location identified by the geospatial coordinates identified below and one DCS at the boundary location identified by the geospatial coordinates identified below. Sampling at each location will be accomplished at approximately 4 to 6 feet above the ground level to account for the breathing zone. Samplers will be placed at a distance of at least twice the height from any on-site/off-site obstruction (buildings, trees, etc.), to mitigate boundary layer effects. Samples will be collected via pre-conditioned XAD cartridges obtained from the USAPHC laboratory. Cartridges will be changed-out every 8 hours.</p>					

Figure B-2. Ambient Air: Sampling and Analytical Method(s) (Sheet 1 of 3)

OEH Threat	Sampling Equipment and Media	Analysis Method*	Sampling Rate	Sampling Duration	Sampling Frequency
SO ₂	MultiRae Plus Multi-gas detector with SO ₂ sensor	Data logging function (1 minute intervals)	N/A	24 hours	Daily
<p>Rationale: Monitor for 14 consecutive days to determine typical ambient air exposure concentrations associated with the normal ambient conditions and fugitive emissions from the coal power plant.</p> <p>Procedures: Place MultiRae Plus using the data logging function at locations identified below. Sampling will be accomplished approximately 4 to 6 feet above the ground level to account for the breathing zone. Equipment will be placed at a distance of at least twice the height from any on-site/off-site obstruction (buildings, trees, etc.), to mitigate boundary layer effects. Every 8 hours data should be downloaded and logged in the field data log. Personnel should check and recharge batteries as required.</p>					
Sampling locations (refer to site map)		MGRS coordinates			
		Latitude		Longitude	
1. Center of the site		32° 4' 8.84" N		20° 15' 44.56" E	
2. Boundary location closest to the power plant		32° 4' 42.65" N		20° 15' 18.66" E	
<p>Rationale: Sampling from the center of the site will be representative of typical ambient conditions. The sampling point nearest the coal plant will take into account worst case conditions when wind direction causes the site to be downwind from the plant.</p>					
Meteorological and Topographic Considerations					
<p>The site is located in a relatively open area. Monitoring stations to record wind direction and speed, barometric pressure, and ambient air temperature will be established at each sampling location and recorded for each sampling event. It is important to note which sampling events took place when conditions placed the site downwind from the coal plant.</p>					
QA/QC Requirements					
<p>The DPS, DCS, and the MultiRae Plus must be calibrated pre- and post-sampling in accordance with manufacturer's specifications and sampling and analytical methods.</p> <p>Trip blanks and collocated samples.</p> <p>PM₁₀, PM_{2.5} and heavy metals samples: Submit one trip blank for each 10 field samples taken, or fraction thereof.</p> <p>PAHs: Submit trip blank and duplicate sample for each 10 field samples taken.</p>					
OEELs					
Particulate Matter					
OEH threat	Short-term (24 hour) MEGs			Long-term MEGs	
	Critical	Marginal	Negligible	Marginal	Negligible
PM ₁₀	600 µg/m ³	420 µg/m ³	250 micro grams per cubic meter (µg/m ³)	Not Defined	Not Defined
PM _{2.5}	500 µg/m ³	250 µg/m ³	65 µg/m ³	65 µg/m ³	15 µg/m ³

Figure B-2. Ambient Air: Sampling and Analytical Method(s) (Sheet 2 of 3)

Other–Air						
OEH threat	1 hour MEGs			8 hour MEG	14 day MEG	1 year MEG
	Critical	Marginal	Negligible			
SO ₂	30 ppm	0.76 ppm	0.2 ppm	0.2 ppm	0.2 ppm	
Heavy metals*						
PAHs*						
OEH threat	10 minute MEGs					
	Critical	Marginal	Negligible			
SO ₂	30 ppm	0.76 ppm	0.2 ppm			
* For specific target analytes' MEGs, reference TG-230.						

Figure B-2. Ambient Air: Sampling and Analytical Method(s) (Sheet 3 of 3)

OEH Threat	Preservative	Container	Max Holding Time	Volume or Mass	Method
Heavy* metals	Wet: 1–6 degrees Celsius Dry: ambient room temperature	Polyethylene or Glass Teflon lined cap	6 months	100 g	EPA 6010B
Polycyclic aromatic hydrocarbon (PAH)*	1–6 degrees Celsius	Glass Teflon lined cap	5 days	100 g	DIN EN 15527
* For specific target analytes, refer to the analytical method above					
Sampling site size (acres):	6	Sample depth:	Surface	Sample types:	Composite
		Rationale: Atmospheric deposition from coal plant will likely contaminate the surface of the soil.		Rationale: Surface soil contamination is assumed to be homogeneously distributed across the site.	
Sampling approach:	Systematic random	Number of samples:	12	Number of QC samples:	2 Duplicates
Rationale: Chosen to determine the extent of contamination across the site.		Rationale: IAW NMCPHC TM-preventive medicine 6490.2, 2 composite samples/1 acre; each composite sample will consist of 5 discrete samples.		Rationale: IAW NMCPHC TM-preventive medicine 6490.2.	

Figure B-3. Soil Sampling and Analytical Methods (Sheet 1 of 2)

Sampling Locations (refer to site map):		
<p>The site will be divided into 6 testing areas approximately 1 acre each. A 5-by-5 sampling grid will be overlaid for each testing area. A random number generator will be used to select two sets of 5 cells from the total of 25 cells in the grid to determine sampling locations for the discrete samples that will be collected to produce 2 composite samples for each 1 acre testing area. MGRS coordinates will be recorded for each sampling location.</p>		
Field Analytical Equipment Procedures		
<p>Innov-X Alpha 4400 XRF analyzer will be used to screen each sampling location by In situ testing prior to sample collection to determine the presence of heavy metals contamination to validate homogenous distribution. All readings will be recorded for each sampling location. For any sample location with results greater than a 50-percent variance from baseline average concentration of all the sampling locations in the testing area, a discrete sample will be taken at that particular location.</p>		
Sampling Procedures		
<p>Each discrete sample will be collected at the approximate center of the cell using a clean stainless steel trowel and placed in a clean stainless steel compositing pan. Each discrete sample will be approximately equal in size. All existing vegetation will be removed prior to sample collection. Any extraneous material such as rocks, leaves, and etc., will be removed from the soil samples before compositing. After five discrete samples have been collected into the pan, the soil will be homogenized by mixing or blending. Aliquots of approximately equal size will be extracted from the stainless steel bowl using the trowel and placed in an EPA approved sample container. Sample material remaining in the stainless steel bowl will be re-composited by mixing prior to extraction of successive aliquots. Sufficient samples will be removed to completely fill the container for each sample.</p> <p>Note: discolored soil, stressed vegetation, etc., should be noted for the sampling location, if present.</p>		
QA/QC Requirements		
<p>Two duplicate samples will be taken. Sampling trowel and compositing pan will be decontaminated with de-ionized water after each composite sample or after a discrete sample is taken due to high field analytical screening result. XRF standardization and QA/QC procedures will be followed per instrument standard operating procedures. All samples will be placed in the appropriate sample container, preserved, and shipped to ensure compliance with holding times as identified above.</p>		
OEELs		
OEH threat	1 year negligible	
Heavy metals*		
PAHs*		
* For specific target analytes' MEGs, reference TG-230.		

Figure B-3. Soil Sampling and Analytical Methods (Sheet 2 of 2)

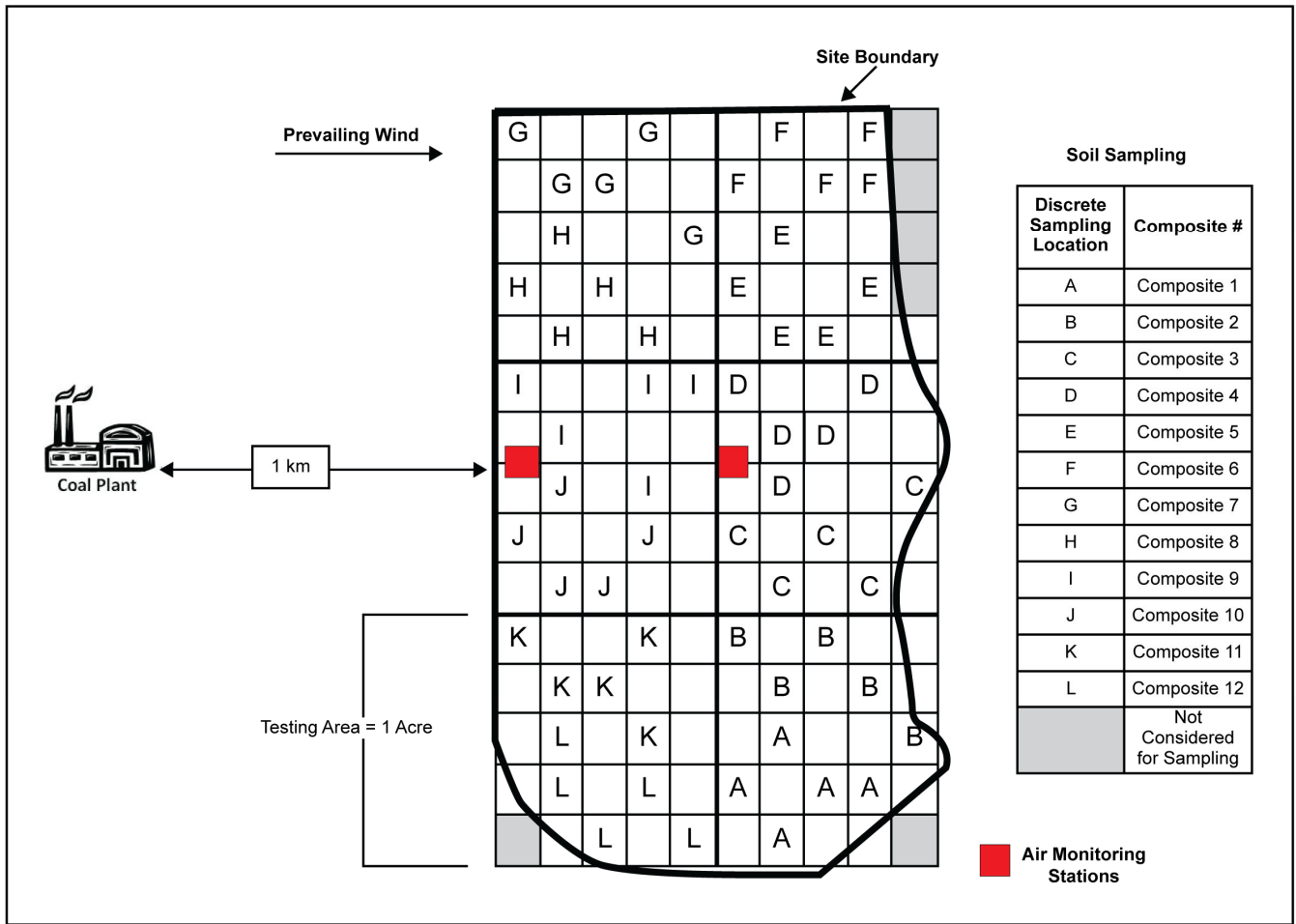


Figure B-4. Occupational and Environmental Health Sample and Analysis Plan Site Map

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APPENDIX C

Example Defense Occupational and Environmental Health Readiness System Occupational and Environmental Health Site Assessment Report

C.1 DEFENSE OCCUPATIONAL AND ENVIRONMENTAL HEALTH READINESS SYSTEM OCCUPATIONAL AND ENVIRONMENTAL HEALTH SITE ASSESSMENT

Once Service preventive medicine personnel complete an OEHSA report and input all information into the DOEHRS they are able to generate an OEHSA report that provides a record of all information collected throughout Phases I and II of the OEHSA. This report also documents the consolidated conceptual site model that is then used to drive the Phase III sampling and analysis plan.

C.2 EXAMPLE SURVEY REPORT

A sample survey report is included in order to give Service preventive medicine personnel an example of a DOEHRS-generated OEHSA report. This sample report provides an example of the level of information that preventive medicine personnel should collect and record in order to provide comprehensive documentation of the survey findings.

OEHSa Survey Report			
<p>Location Name: Site ABC Airfield Survey ID: 23122 * Indicates Required Field</p>			
General Survey Information			
Survey Start Date/Time *	2011/07/21 1652	Status	<input checked="" type="checkbox"/> In Progress <input type="checkbox"/> Ready for QA <input type="checkbox"/> Approved by QA
Survey Completion Date/Time			
Surveyor's Name		Surveyor's Email	
Surveyor's Phone Number		Surveyor's Unit	
1. Administrative Data			
Parent Location Name	Site ABC Airfield		
Location Aliases	Camp XYZ		
Geographic Location (Geo-coordinates)			
There are no geo-coordinates			
Notes			
Units and Detachments/Teams/Elements Present	Data classified and is supplied in a separate classified OEHSa report.		
Camp Fixed Population	Data classified and is supplied in a separate classified OEHSa report.		
Rotation Schedule	6 months	Number of U.S. Troops, if not U.S. Camp	See classified OEHSa
Attachments			
There are no attachments			
2. Survey Background			
Scope of Mission	This occupational and environmental health site assessment (OEHSa) was performed to identify and document complete or potentially complete exposure pathways that could affect the health of personnel. A site specific sampling and analysis plan (SAP) was developed from information generated during site reconnaissance. Data obtained via the SAP supports health risk assessment. Health risk assessment serves as the basis for recommending evidence based controls designed to reduce health risks.		
Purpose	This OEHSa was conducted to evaluate the potential health threats associated with environmental contaminants, disease vectors and other occupational and environmental conditions experienced by US Forces operating from this location.		
Methodology	The OEHSa follows an iterative process of data collection, evaluation and interpretation. This methodology provides a systematic, scientifically defensible process for developing conceptual site models (CSM) that describe potential exposure pathways. CSM define areas of concern (AOC) by describing environmental and human factors that may lead to contact with environmental health threats. Each CSM considers the source of chemical, biological or physical stressors in the environment; movement of those stressors through environmental media; a point and route of human exposure and receptor populations within the AOC. The CSM serves as the basis for environmental sampling within all AOC where exposure is likely. Revalidation of the initial CSM and identification of new environmental health threats at a site should be performed at least annually or according to service specific guidelines. Screening health risk assessments are performed on chemicals of concern, confirmed by field portable analytical equipment and/or laboratory analysis that exceed Military Exposure Guidelines (MEG). MEGS are published in US Army Center for Health Promotion and Preventive Medicine Technical Guide 230, Chemical Exposure Guidelines for Deployed Military Personnel. Screening health risk assessments are completed via operational risk management (ORM) and/or other Service specific processes, using conservative (health protective) exposure assumptions.		
Onsite Activities	Data for this OEHSa was compiled from review of historical site information (when available), site reconnaissance, interviews with		
Page 1			

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 1 of 15)

OEHS Survey Report

	<p>knowledgeable persons and field screening of chemical, physical or biological stressors with direct reading instruments. A site specific disease vector threat assessment, based on the presence/absence of disease vectors and their habitats, vector biology/behavior, environmental conditions affecting vector populations and potential for disease transmission, was also completed.</p> <p>CSM were developed from the information collected. They describe occupational or environmental health threats and potential exposure pathways associated with groundwater, surface water, air, soils, sediments, and biota, including disease vectors or infectious agents. All complete and potentially complete exposure pathways identified require further evaluation. The CSM were used to develop a site specific SAP to facilitate evaluation of potential health risks and assist in prioritizing health risk reduction efforts.</p>	
Limitations of Assessment	GPS equipment and sound level meter/noise dosimeter were not available at the time of the assessment.	
General Data Gaps	NA	
Assumptions / Uncertainties	There is an olive orchard located to the north of the base. The Host Nation Liaison stated that limited pesticides are used due to the lack of availability. Due to hostile nature of locals at this time, this information could not be verified.	
Information Sources / Documents Reviewed	<ul style="list-style-type: none"> -National Center for Medical Intelligence -Defense Intelligence Agency -RF Emitter inventory -Oil Refinery Process Description -Cement Plant Process Description -Generator Inventory -Defense Intelligence Report -Defense Intelligence Note 	
Attachments		
Associated Attachment File	Description	Upload Date
Defense Intelligence Report.docx	Defense Intelligence Report	2011/09/08
Defense Intelligence Note.docx	Defense Intelligence Note	2011/09/08
Base Map.JPG	Base Map	2011/09/09

3. Site Description

Physical Setting	ABC Airfield serves Regional Command-Southwest (RC-SW), Helmand Province, Afghanistan. It is located near the town of Baghran, Afghanistan. The airfield is a former airfield used by the Soviet Army during occupation of Afghanistan in the late 1980s. It currently is occupied by US and Coalition forces conducting operations in Afghanistan in support of Operation Enduring Freedom. The area surrounding ABC airfield consists of mainly desert sand, except for an grape orchard about 2 km north of the base where the locals grow grapes and other fruits and vegetables.
Climatic / Weather	The area has hot humid summers (May-Sep) and mild winters (Dec-Feb). Extreme high and low temperatures range from 119 F to 46 F in the summer and 93 F to 32 F in the winter. The mean annual rainfall is approximately 300 millimeters. Winds blow predominately from the northern direction. See the attached wind rose.
Soil	The soil on the base consists of desert sand. There is an area of discolored soil to the east of the base near tent city and the volleyball court.
Groundwater	Groundwater moves generally from north to south beneath the base. The depth to groundwater ranges from approximately 10 meters in the northern part of the base to more than 20 meters in the western portion of the base.
Surface Water	There was no surface water observed on base.
Wetlands, Flood Zones, Coastal Zone, Vegetation present	There is very little vegetation in a few locations throughout the base.
Proposed Site Usage	Benina Air Base
Current and Past Uses of Property	Prior to Soviet occupation in 1979 the airfield was used as a commercial airfield supporting regional flights in and out of southern Afghanistan to bordering countries and to larger airfields within Afghanistan. During the Soviet invasion from 1979-1988 the airfield was occupied by the Soviet Army where mostly rotary wing operations were launched across the southern portion of the country. US and Coalition forces, in conjunction with Afghan National Forces currently use the airfield as a logistics hub to support troop movement, logistics resupply and limited counter insurgency operations throughout the RC-SW sector of the country.

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 2 of 15)

OEHSA Survey Report								
Current and Past Uses of Adjacent Property								
North of Site			Desert land, olive orchard 2 km north of the base					
South of Site			Desert land, cement plant 7 km south of base					
East of Site			Desert land, petroleum refinery 5 km northeast of base					
West of Site			Desert land					
Notes								
Nearby Industrial Facilities								
<i>Are there any nearby industrial facilities?</i>							PRESENT	
Geo-coordinates	Name	Type(s) of Industry	Active	Description	Proximity to Location (in kilometers)			
	Baghran Pride Cement Company	Cement Production Plant	Yes	Cement Processing	7.0			
	Plenty Oil Inc	Oil and Natural Gas Refinery	Yes	Pretroleum Products	5.0			
<i>Do the nearby industrial facilities have the potential to affect personnel?</i>							YES	
Nearby Industrial Facilities Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Plenty Oil Inc.	Air	Sulfur Dioxide, Hydrocarbons, PAH, VOC	Inhalation	Entire Camp	None	24 hours/day, 7 days/week	Marginal	Frequent
CSM Notes								
There is an active petroleum refinery that produces air emissions. The refinery is located approximately 5 km northeast of the base. When the wind blows from north easterly direction a thin layer of smoke can be observed over eastern portion of the base.								
There is a cement plant located 7 km south of the base. Winds blow predominately from the north and occasionally from easterly directions. Due to the location of the cement plant, an exposure to base personnel is not anticipated.								
Attachments								
Associated Attachment File			Description	Upload Date				
Wind Rose.docx			Wind Rose	2011/09/08				
4. Site Infrastructure								
Onsite Industrial Operations								
<i>Are there any existing onsite industrial operations? Give info on scope of activities, size of facilities, who performs the operations, hazards present. (i.e. Vehicle Maintenance, Aircraft Maintenance, etc.)</i>							PRESENT	
There is an Air Force Red Horse Flight performing construction on the north end of the flightline. Future projects include paving the roads and applying loose gravel to the tent areas to keep the sand down.								
<i>Do the industrial operations have the potential to affect workers and/or camp personnel?</i>							NO	
IH Shops List								
There are no Baseline or Periodic Surveys for the IH shops associated with this location								
Description of Structures								
<i>Describe the structures on the camp and what they are used for: housing, maintenance, or office space. (Include Heating/Ventilation Systems and Potential for Radon)</i>							PRESENT	
Page 3								

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 3 of 15)

OEHS Survey Report								
<input checked="" type="checkbox"/> Tents			<input type="checkbox"/> Semi-Permanent			<input checked="" type="checkbox"/> Permanent		
There are hardened facilities on base. However, they are in bad repair and are not utilized. Tents are used for all military operations, medical facility and housing.								
Do the conditions of structures have the potential to affect personnel?								NO
Description of Roads / Hardstand								
Describe the road conditions: paved, gravel, or dirt. Are there problems with dust generated from vehicle traffic?						PRESENT		
<input checked="" type="checkbox"/> Unpaved			<input type="checkbox"/> Gravel			<input type="checkbox"/> Paved		
All roads on base are unpaved and consist of desert sand. Vehicle traffic and windy conditions contribute to dust generation throughout the base.								
Does the dust or noise from vehicle traffic have the potential to affect personnel?								YES
Roads/Hardstand Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Unpaved Roads	Air	Particulate	Inhalation	Entire Camp	None	24 hours/day, 7 days/week	Marginal	Likely
CSM Notes	See Air Quality (section 9).							
Description of Power Generation								
Describe how power is supplied to the camp: individual and/or bulk generators or city power. (Include Potential Electrical Hazards and Sources of PCBs)						PRESENT		
<input checked="" type="checkbox"/> Tactical Generators			<input type="checkbox"/> Commercial Generators			<input type="checkbox"/> Municipal/Local Grid		
Tactical Generators are used to supply power to all base facilities. All generators are enclosed by a barrier to keep the noise levels low.								
Does the noise and exhaust from generator farms have the potential to affect personnel?								YES
Power Generation Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Tactical Generator	Air	Diesel Exhaust	Inhalation	Tent City Residents	None	24 hours/day, 7 days/week	Negligible	Occasional
Generators	Other	Noise	Physical	Generator Maintainers	Hearing Protection	7 days/week, 2 hours/day	Negligible	Seldom
Tactical Generator	Other	Hazardous Noise	Physical	Tent City Residents	Enclosure	24 hours/day, 7 days/week	Negligible	Unlikely
CSM Notes	Due to the close vicinity of living quarters, there is potential exposure to diesel exhaust and hazardous noise.							
Contractor Services								
What services are contractors performing at the site? (Include Contractors, Sub-Contractor Names, or HN Contracts w POC/company info)						PRESENT		
Contractor Name			Services Provided			Notes		
Helmand Waste Management			Waste Water			Latrine and shower waste water disposal		
Baghran Pride Cement Company			Other			Contractor provides cement for flightline repair and supplies base with protective barrier.		
Attachments								

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 4 of 15)

OEHS Survey Report

Associated Attachment File	Description	Upload Date
Industrial Shop List.pdf	Industrial Shop List	2011/09/09
Generator Inventory.pdf	Generator Inventory	2011/09/09
Samples		
There are no samples		
Surveys		
There are no surveys		

5. Hazardous Materials

Petroleum Distribution Points

Are there any existing or former fuel points?							PRESENT	
Fuel Type	Location Description	Container Size	Number of Containers	Container Type	Age/Condition	Above/Below Ground	Contractor Operated	
Diesel	Fuel Tank Farm SSW of the base	1,000 gallons	2	Carbon Steel	5 years	Above	No	
JP-8	Fuel Tank Farm SSW of the base	100,000 gallons	3	Carbon Steel	5 years	Above	No	
Do petroleum distribution sites have the potential to affect personnel? (Current, Past, Potential)							NO	

Notes	The fuel tanks are in good condition and no signs of contamination were observed at the tank farm.
Past Releases	There are 11 55-gal unmarked drums stored alongside the fence on the south east corner of the base. The drums look damaged and a 3 X 4 ft area of discolored soil with a strong fuel odor was noted during the reconnaissance. Initial readings with the TVA-1000 revealed a level of 10 ppm for VOCs. Further soil samples will need to be sent to the lab for further analysis.
Potential Releases	There is a potential for JP-8 and Diesel release at the tank farm by the flight line due to connecting and disconnecting hoses. Personnel have been trained on the proper procedures of connecting and disconnecting hoses while filling delivery trucks. At the time of reconnaissance, there was no sign of any past releases.

Hazardous Material Storage/Unidentified Substances

Describe hazardous material storage sites and unidentified substance sites (anything other than petroleum products). This may also include past use industries that have contaminated the area prior to US occupation.							PRESENT	
Material Type	Location Description	Container Size	Number of Containers	Container Type	Container Age/Condition	Above/Below Ground	Contractor Operated	
Unmarked drums	Southwest corner of base by perimeter fence	55 gallon damaged metal drums	11	55 gallon damaged metal drums	55 gallon damaged metal drums	Above	No	
Do hazardous material storage/unidentified substance sites have the potential to affect personnel?							YES	

Hazardous Material Storage / Unidentified Substance Sites Conceptual Site Models

Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Unmarked Drums Near Tent City	Air	Fuel Constituents, Heavy Metals	Inhalation	Tent City Residents	None	7 days/week, 24 hours/day	Marginal	Occasional
Unmarked Drums Near Tent City	Soil	Fuel Constituents, Heavy Metals	Skin Contact	Tent City Residents	None	7 days/week, 24 hours/day	Marginal	Occasional
Unmarked Drums Near Tent City	Soil	Fuel Constituents, Heavy Metals	Ingestion	Tent City Residents	None	7 days/week, 24 hours/day	Marginal	Occasional

CSM Notes Due to the close vicinity of living quarters, there is potential exposure to fuel constituents from contaminated soil. Screening sampling

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 5 of 15)

OEHSA Survey Report						
with the TVA 1000 indicated 10 ppms of VOCs.						
Hazardous Material Disposal						
Include Information, Local Company Information, POC. Who picks it up, method of pickup, frequency of pickup? Where does it go? Location with Coordinates and how long does it remain? How is it stored?						ABSENT
DRMO		US Contractor		Local Contractor		
NA						
Hazardous Material Migration						
Describe any hazardous material that have or could leave the location.						ABSENT
NA						
Attachments						
Associated Attachment File		Description		Upload Date		
Unmarked Drums.JPG		Unmarked Drums		2011/09/09		
Samples						
There are no samples						
Surveys						
There are no surveys						
6. Waste Management						
Solid Waste						
(Residential, Industrial, Agricultural, Medical, Other)						PRESENT
Type	Source(s)	Disposal Method(s)	Contractor Operated	Notes		
Residential	DFAC, Tent City	Burn Pits	No			
Regulated Medical	Medical Aid Station	Burn Pits	No			
Industrial	Construction material	Burn Pits	No			
Past Solid Waste Releases/Spills						
Landfills						
						PRESENT
Description	Location	Geo-coordinates	Material Disposed	Disposal Volume/Day	Operator	Daily Cover
Uncovered landfill - 100 feet	Southeast area of base outside the perimeter		Residential	Unknown	Unknown	No
Do landfills have the potential to affect personnel?						NO
Incinerators/Burn Pits						

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 6 of 15)

OEHS Survey Report								
						PRESENT		
Description	Location	Geo-coordinates	Material Disposed	Disposal Volume/Day	Operator	Supplemental Fuel(s)		
Burn Pit	East side of the base; approximately one mile from tent city.		Residential, Industrial, Regulated Medical, Universal	Unknown	SrA Nicole Penny	Diesel		
Do the emissions from the Incinerator/Burn Pit have the potential to affect personnel?						YES		
Incinerators/Burn Pits Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Burn Pit	Air	Dioxins, Particulate Matter, PAH, VOCs	Inhalation	All Camp Population	None	7 days/week, 24 hours/day, 7 days/week	Critical	Likely
Burn Pit	Air	Dioxins, Particulate Matter, PAH, VOCs	Inhalation	Site Attendant	Surgical Mask	6 days/week, 12 hours/day	Critical	Likely
CSM Notes	The burn pit poses a major hazard to the base, due to its location and proximity to tent city. Predominate winds are from the north and north-north east which carry the smoke right over tent city. When the winds shift and blow from easterly directions, the entire base could become a population at risk.							
Wastewater								
What are the sources/types? How is it collected, treated, discharged/disposed?						ABSENT		
General Notes								
How is storm water managed?	There is currently no storm water management program in place.							
Is wastewater or storm water reused for beneficial purposes?	No							
Attachments								
Associated Attachment File	Description				Upload Date			
Burn Pit2.JPG	Burn Pit Pictures				2011/09/09			
Burn Pit1.JPG	Burn Pit Pictures				2011/09/09			
Samples								
There are no samples								
Surveys								
There are no surveys								
7. Entomology								
Disease Threats								
List diseases and the risk estimate for each						ABSENT		
Vectors Present								
Are disease vectors present? If yes, complete specifics below if possible.						ABSENT		
Pests Present								

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 7 of 15)

OEHSA Survey Report								
<i>Are pests present? If yes, complete specifics below if possible.</i>				ABSENT				
Entomological Assessment	NA							
Health Assessment	NA							
Countermeasures/Pest Management Control	NA							
Pesticide Use	NA							
Attachments								
There are no attachments								
Samples								
There are no samples								
Surveys								
There are no surveys								
8. Physical Hazards								
Non-ionizing Radiation Sources								
<i>(Com Antennas, lasers, ultraviolet, bright lights, infrared, illuminators).</i>				PRESENT				
Location/Description	Source	Source Distance to Personnel (in meters)	Levels/Amount/Class	Measurement Distance (in meters)				
North & South end of the flightline/AN/FRN-45	TACAN Receiver/transmitter	100 feet	Unknown	Cont. - 3.5 ft, Uncont - 7.8 ft				
South end of the flightline / WSR-88D	Other Radiofrequency Sources	150 feet	Unknown	Cont. - 1082 ft, Uncont. - 2418 ft				
Communication Tent/AN/GRC-171	Other Radiofrequency Sources	Unknown	Unknown	cont - 2.7 ft, uncont - 5.9 ft				
Communication Tent/AN/GRT-21	Other Radiofrequency Sources	Unknown	Unknown	cont - 4.1 ft, uncont - 9.2 ft				
Communication Tent/AN/URC-119	Other Radiofrequency Sources	Unknown	Unknown	cont - 3.8 ft, uncont - 8.4 ft				
Notes								
Do non-ionizing radiation sources have the potential to affect personnel?				YES				
Non-ionizing Radiation Sources Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
WSR-88D Weather Radar	Other	Non-ionizing Radiation	Physical	EMEDS personnel and patients	None	7 days/week, 24 hours/day	Negligible	Unlikely
CSM Notes	The controlled/uncontrolled hazard distance for the WSR-88 D weather radar is 1080ft/2418 ft respectively. The EMEDs tent is approximately 2000 feet from the radar. A survey needs to be accomplished to determine if EMEDS personnel or patients may be exposed to RF radiation. The remaining emitters have a short hazard distance and are not considered a hazard to personnel.							
Ionizing Radiation Sources								
<i>If known, attach inventory of sources.</i>				ABSENT				
Environmental Noise Sources								
<i>Are noise sources present? If so, describe sources.</i>				PRESENT				

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 8 of 15)

OEHSA Survey Report								
Location/Description	Source	Source Distance to Personnel (in meters)		Noise Level	Measurement Distance (in meters)			
Airfield west of base	Flightline	1 km to tent city		TBD dBA	TBD			
Notes								
Do noise sources have the potential to affect personnel?								YES
Environmental Noise Sources Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Flightline	Other	Noise	Physical	Tent City Residents	None	24 hours/day, 7 days/week	Critical	Likely
CSM Notes		Due to the close vicinity of living quarters, there is potential exposure to flightline noise due to aircraft taxi/take off & landing.						
Attachments								
Associated Attachment File			Description			Upload Date		
Consultant Report.pdf			Consultant Report			2011/09/09		
RF Inventory.pdf			RF Inventory			2011/09/09		
Samples								
There are no samples								
Surveys								
There are no surveys								
9. Air Quality								
Ambient (Outside) Air Quality								
<i>Describe sources and their locations that impact the ambient air and/or introduce potential hazards:</i>								
The ambient air quality may be adversely impacted by unpaved roads and vehicle traffic. Easterly winds can bring strong sand storms from the desert plains located in the western parts of Afghanistan.								
Do ambient air quality sources have the potential to affect personnel?								YES
Ambient Air Quality Conceptual Site Models								
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability
Desert Sand	Air	Particulate Matter	Inhalation	Entire Base	None	24 hours/day, 7 days/week	Negligible	Occasional
CSM Notes		All roads on base are unpaved and consist of desert sand. Vehicle traffic and windy conditions contribute to dust generation around the base. Exposure to particulate matter can result in chronic health effects for base personnel.						
Indoor Air Quality								
<i>Do occupants complain about dust, odor(s), stale air, or have symptoms of eye, throat, and nose irritation? Are generators placed near building openings? Note: Carbon monoxide and other combustion by products should be controlled to as low as reasonably achievable, not the MEG. Presence of substance appearing to be visible mold? Do they occupy newly built structures?</i>								
NA								
Do indoor air quality sources have the potential to affect personnel?								NO

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 9 of 15)

OEHSA Survey Report									
Attachments									
There are no attachments									
Samples									
There are no samples									
Surveys									
There are no surveys									
10. Water									
Natural Water Sources									
								PRESENT	
Name	Type	Potential Sources of Contamination			Intended Use(s)		Notes		
Baghran Aquifer	Well	Industrial chemical spills, underground storage tank leaks, sewer leaks and run-off or leachate from wastewater and waste disposal sites , seawater intrusion.			Showering, Personal Hygiene, Cooking				
Do natural water sources have the potential to affect personnel?								YES	
Natural Water Sources Conceptual Site Models									
Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Severity	Probability	
Baghran Aquifer	Water	VOCs, Sewage, Nitrates, Chloride	Ingestion	Entire Base	ROWPU	24 hours/day, 7 days/week	Critical	Occasional	
CSM Notes	Results from sampling have indicated a couple total Coliform positive samples, but there have been no fecal Coliform positive samples. In the desert heat the chlorine dissipates pretty quickly.								
Municipal Water Sources									
								ABSENT	
Bottled Water Sources									
								PRESENT	
Brand		VETCOM Approved			Intended Use(s)		Notes		
Nestle		Yes			Primary Drinking				
Do bottled water sources have the potential to affect personnel?								NO	
Water Treatment Systems									
								PRESENT	
Name	Sources	Type	Container Location	Operating Organization Type	Operating Organization Name/POC	Production Capacity/Rate	Intended Use(s)	Water Distribution System	

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 10 of 15)

OEHSA Survey Report								
ROWPU	Baghran Aquifer	Civilian - Other (Specify) - ROWPU	Fixed	Type	Name/POC	200 Gallons/Day	Personal Hygiene	System
				DOD	Sgt Haines			Water is piped from Well 1 to Bladder 1 where it is stored until treated with a ROWPU. After treatment the water is piped to Bladder 2 where it is stored until distributed to base facilities.
Do water treatment systems have the potential to affect personnel?								NO
Water Surveillance Program		Chlorine, pH and bacteriological monitoring is performed on bottled water and ROWPU treated water.						
Attachments								
There are no attachments								
Samples								
There are no samples								
Surveys								
There are no surveys								
11. General Sanitation								
<i>Describe the type (e.g. gymnasium, barber shops, laundry, detainee facility, etc.), location, status of facility, etc. For future inspections.</i>							ABSENT	
Notes		NA						
Attachments								
There are no attachments								
Samples								
There are no samples								
Surveys								
There are no surveys								
12. Food Sanitation								
<i>Describe the location and general condition of the facility, status of facility, etc. For future inspections.</i>							ABSENT	
Notes		NA						
Attachments								
There are no attachments								
Samples								
There are no samples								

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 11 of 15)

OEHS Survey Report

Surveys

There are no surveys

13. Personnel Contacted

Who did you talk to/interview in each area? (attach interview notes). Include all POCs, Contractors, Sub-Contractors, Medical Personnel responsible for ensuring health of Dining Facility Crews)

Name	Email	Phone	Title	OEHS Area
Ms. Jaimee Sanders	Jaimee.Sanders@af.mil	435-6565	Logistics Manager	Hazardous Materials, Waste Management
Major Jack Pain	Jack.Pain@army.mil	894-2223	GRL OIC	Physical Hazards, Air Quality, Water
Mr. Ali Baba	alibaba@benin.af.mil	435-8899	Host Nation Liason	Administrative Data, Survey Background, Site Description
Sgt Jacob Haines	Jacob.Haines@af.mil	435-7281	Red Horse Chief	Site Infrastructure, Hazardous Materials, Water
Notes				

Attachments

There are no attachments

Samples

There are no samples

Surveys

There are no surveys

14. Other Environmental Health Concerns

Anything that does not fit in above sections. Things to discuss (if applicable): areas of stressed vegetation, evidence of mounds or depressions, pits, ponds, lagoons, farm wastes, excessive pesticide used, oil/water separators, unknown substances, ranges/unexploded ordnance, etc.

ABSENT

Attachments

There are no attachments

Samples

There are no samples

Surveys

There are no surveys

15. Consolidated Conceptual Site Model

Section	Source	Environ Media	Health Threat	Route of Exposure	Population Affected (#)	Existing Controls	Frequency/Duration	Priority
Site Description	Plenty Oil Inc.	Air	Sulfur Dioxide, Hydrocarbons, PAH, VOC	Inhalation	Entire Camp	None	24 hours/day, 7 days/week	High
Site Infrastructure	Unpaved Roads	Air	Particulate	Inhalation	Entire Camp	None	24 hours/day, 7 days/week	Moderate
Hazardous Materials	Unmarked Drums Near Tent City	Air	Fuel Constituents, Heavy Metals	Inhalation	Tent City Residents	None	7 days/week, 24 hours/day	Moderate
Hazardous Materials	Unmarked Drums Near Tent City	Soil	Fuel Constituents, Heavy Metals	Skin Contact	Tent City Residents	None	7 days/week, 24 hours/day	Moderate
Hazardous	Unmarked	Soil	Fuel	Ingestion	Tent City	None	7 days/week,	Moderate

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 12 of 15)

OEHS Survey Report

Materials	Drums Near Tent City		Constituents, Heavy Metals		Residents		24 hours/day	
Waste Management	Burn Pit	Air	Dioxins, Particulate Matter, PAH, VOCs	Inhalation	All Camp Population	None	7 days/week, 24 hours/day, 7 days/week	High
Waste Management	Burn Pit	Air	Dioxins, Particulate Matter, PAH, VOCs	Inhalation	Site Attendant	Surgical Mask	6 days/week, 12 hours/day	High
Site Infrastructure	Tactical Generator	Air	Diesel Exhaust	Inhalation	Tent City Residents	None	24 hours/day, 7 days/week	Low
Site Infrastructure	Generators	Other	Noise	Physical	Generator Maintainers	Hearing Protection	7 days/week, 2 hours/day	Low
Site Infrastructure	Tactical Generator	Other	Hazardous Noise	Physical	Tent City Residents	Enclosure	24 hours/day, 7 days/week	Low
Air Quality	Desert Sand	Air	Particulate Matter	Inhalation	Entire Base	None	24 hours/day, 7 days/week	Low
Physical Hazards	WSR-88D Weather Radar	Other	Non-Ionizing Radiation	Physical	EMEDS personnel and patients	None	7 days/week, 24 hours/day	Low
Water	Baghran Aquifer	Water	VOCs, Sewage, Nitrates, Chloride	Ingestion	Entire Base	ROWPU	24 hours/day, 7 days/week	High
Physical Hazards	Flightline	Other	Noise	Physical	Tent City Residents	None	24 hours/day, 7 days/week	High

16. On-Site Screening Results

Date/Time	Geo-coordinates	Media	Analyte	Result	Notes
Tue Sep 06 13:25:00 CDT 2011		Soil	VOCs	10 ppm	According to guidance provided by the US Army Public Health Command, soil contamination is present at a level of 5 ppm. Further samples for shipment to the lab need to be taken.

17. Direct Reading Instrumentation and Associated Calibrations

Instrument	Calibration Date	Notes
TVA 1000	2011/01/28	

Attachments

There are no attachments

18. Executive Summary Findings

1. There is an active petroleum refinery that produces air emissions. The refinery is located approximately 5 km northeast of the base. When the wind blows from north easterly direction a thin layer of smoke can be observed over eastern portion of the base. Prolonged exposure may lead to respiratory conditions for deployed personnel and may adversely impact mission capability.
2. There is a cement plant located 7 km south of the base. Winds blow predominately from the north and occasionally from easterly directions. Due to the location of the cement plant, an exposure to base personnel is not anticipated.
3. All roads on base are unpaved and consist of desert sand. Vehicle traffic and windy conditions contribute to dust generation around the base. Exposure to particulate matter can result in chronic health effects for base personnel.
4. Tactical generators are use to supply power to the tents for air conditioning. All generators are enclosed by barriers to keep the noise down.
5. There are 11 unmarked 55 gal drums stored alongside the fence on the south east corner of the base. The drums look damaged and a 3 X 4 ft area of discolored soil with a strong fuel odor was noted during the reconnaissance. Initial readings with the TVA 1000 revealed a level of 10 ppm for VOCs. A volleyball court and tent city is located adjacent to the contaminated area. Prolonged exposure to contaminated area may pose potential inhalation, ingestion and contact hazards to personnel.

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 13 of 15)

OEHS Survey Report

- 6. The burn pit poses a major hazard on the base, due to its location and proximity to tent city. The predominate winds are from the north and north-northeast which carries the smoke right over tent city. When the winds shift from an easterly direction, the entire base could become a population at risk. Prolonged exposures to dioxins, particulate matter, PAH, VOCs can cause acute and chronic health effects to base personnel and may have a negative impact on the mission capability.
- 7. The WSR 88D weather radar is located in close proximity (approximately 2000 feet) to the EMEDS tent. The hazard distance for the radar is 1082ft in a controlled environment and 2418ft in an uncontrolled environment. There is a potential that EMEDS personnel and patients may be exposed to non-ionizing radiation.
- 8. Tent city is currently located approximately 1 km from the flightline. Noise levels from engine run-ups and F-16 landing and take offs could potentially interfere with rest cycle of tent city personnel.
- 9. The drinking water system from Baghran has become unreliable due to lack of maintenance and war damage. There have been numerous positive samples for total Coliform and an occasional fecal Coliform. The cause of the positive samples is more likely from the dilapidated drinking water system infrastructure and not the water quality itself. A decision was made to use bottled water. Water from the Desert Spring is treated by ROWPU for hygiene purposes.

19. Executive Summary Recommendations

- 1. A surveillance plan needs to be established to monitor the air emissions from the refinery. The refinery's air emission inventory and process description is attached.
- 2. Due to the location of the cement plant (7 km south of the base) exposure to particulate matter to the base residence is not anticipated. A process description was obtained from the plant and is attached.
- 3. A detailed sampling plan needs to be established to measure the particulate matter concentration. PM samples should be collected routinely during each rotation.
- 4. The barriers around the tactical generators seem to provide adequate protection against elevated noise levels and diesel exhaust. Noise survey should be conducted to record the noise levels.
- 5. The contaminated area caused by the 55 gallon drums, has been cordoned off to limit access to the area. Clean up operations of the area should be conducted as soon as possible to minimize adverse health effects to base personnel. A detailed soil analysis needs to be conducted for this area to establish baseline soil contamination levels.
- 6. A detailed sampling plan needs to be established to capture exposures from the burn pit to base personnel.
- 7. A detailed non-ionizing radiation assessment needs to be conducted to assess if EMEDS personnel and patients may be exposed to non-ionizing radiation.
- 8. A detailed noise study needs to be conducted to assess the effects of noise levels from the flightline to tent city residents.

20. Reviewed and Communicated to Command

Assessment Reviewed by		Date	
Communicated to the Command:			
To			
Position			
Unit			
Email Address			
Phone Number			
On			
By			
Via			

21. Consolidated List of Attachments/Samples/Surveys

Attachments			
Section	Associated Attachment File	Description	Upload Date
Survey Background	Base Map.JPG	Base Map	2011/09/09
Survey Background	Defense Intelligence Note.docx	Defense Intelligence Note	2011/09/08
Survey Background	Defense Intelligence Report.docx	Defense Intelligence Report	2011/09/08
Site Description	Wind Rose.docx	Wind Rose	2011/09/08

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 14 of 15)

OEHSA Survey Report			
Site Infrastructure	Generator Inventory.pdf	Generator Inventory	2011/09/09
Site Infrastructure	Industrial Shop List.pdf	Industrial Shop List	2011/09/09
Hazardous Materials	Unmarked Drums.JPG	Unmarked Drums	2011/09/09
Waste Management	Burn Pit2.JPG	Burn Pit Pictures	2011/09/09
Waste Management	Burn Pit1.JPG	Burn Pit Pictures	2011/09/09
Physical Hazards	Consultant Report.pdf	Consultant Report	2011/09/09
Physical Hazards	RF Inventory.pdf	RF Inventory	2011/09/09
Samples			
There are no samples			
Surveys			
There are no surveys			
Program Office Information			
Last Edited By		GARNER, CYNTHIA M	
Last Edit Date		2011/09/23	
Responsible Program Office Personnel		GARNER, CYNTHIA M	
Page 15			

Figure C-1. Occupational and Environmental Health Site Assessment Survey Report Example (Sheet 15 of 15)

APPENDIX D

Periodic Occupational and Environmental Monitoring Summary Military Deployment Example

Military Deployment
Periodic Occupational and Environmental Monitoring Summary (POEMS):
Bagram Air Field, Afghanistan CY: (2002 to 2010)

AUTHORITY: This periodic occupational and environmental monitoring summary (POEMS) has been developed in accordance with Department of Defense instruction DODI 6490.03, 6055.05, and Joint Chiefs of Staff memorandum MCM 0028-07, See *REFERENCES*.

PURPOSE: This POEMS documents the DoD assessment of base camp level occupational and environmental health (OEH) exposure data for Bagram Air Field (BAF). It presents the identified health risks and associated medical implications. The findings are based on information collected from January 2002 through October 2010 to include OEH sampling and monitoring data (e.g. air, water, and soil), field investigation and health assessment reports, as well as, country and area-specific information on endemic diseases. While this assessment may reflect similar exposures and risks pertaining to historic or future conditions at this site, the underlying data are limited to the time period(s) and area(s) sampled and thus may not reflect fluctuations or unique occurrences. It also may not be fully representative of all the fluctuations during the timeframe. To the extent that the data allow, this summary describes the general ambient conditions at the site and characterizes the risks at the *population-level*. While useful to inform providers and others of potential health effects and associated medical implications, it does not represent an individual exposure profile. Actual individual exposures and specific resulting health effects depend on many variables, and should be addressed in individual medical records by providers as appropriate at the time of an evaluation of a unique exposure.

SITE DESCRIPTION: The BAF is located in the Parwan Province of northern Afghanistan approximately 11 km southwest of the city of Charikar, 47 km north of Kabul and is situated approximately 1,500 m above sea level. The climate is semi-arid with precipitation (snow and rain) concentrated in the winter months. Weather conditions can vary widely with temperature ranging from 21–33 °C (70–91 °F) in the summer months, and –7–10 °C (19–50 °F). Strong winds (above 25 knots) can create intense dust storms, especially during the spring and summer. The airfield is approximately 38,000 acres in size and has an 11,820 foot runway serving as a hub for air freight and the movement of military personnel for eastern Afghanistan, and receives and stages larger freight transported overland from the Port of Karachi. The BAF has three large hangers, a control tower, and numerous support buildings.

SUMMARY: Table 1, on pages 3 and 4 provides a list of the overall identified health risks at BAF. 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 table 1, 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.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 1 of 24)

Short-term health risks and medical implications:

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

Inhalable coarse particulate matter less than 10 micrometers in diameter (PM₁₀); inhalable fine particulate matter less than 2.5 micrometers in diameter (PM_{2.5}); food/waterborne diseases (e.g., bacterial diarrhea, Hepatitis A, Typhoid fever, Brucellosis, diarrhea-cholera, diarrhea-protozoal Hepatitis E); other endemic diseases (cutaneous leishmaniasis, Crimean-Congo hemorrhagic fever, Sandfly fever, Typhus-miteborne, Leptospirosis, Tuberculosis (TB), Rabies, Anthrax, Q fever); venomous insects and animals (e.g., snakes, scorpions, spiders); heat stress, and burn pits. For food/waterborne diseases (e.g., bacterial diarrhea, hepatitis A, Typhoid fever, Brucellosis, diarrhea-cholera, Hepatitis E), if ingesting local food and water, the health effects can temporarily incapacitate personnel (diarrhea) or result in prolonged illness (Hepatitis A, Typhoid fever, Hepatitis E, and Brucellosis). For heat stress, risk can be greater for susceptible persons including those older than 45, of low fitness level, or with underlying medical conditions. Risk of heat injury is reduced through preventive measures. Risks from food/waterborne diseases may have been reduced with preventive medicine controls and mitigation, which includes Hepatitis A and Typhoid fever vaccinations. For other vector-borne endemic diseases (cutaneous leishmaniasis, Crimean-Congo hemorrhagic fever, Sandfly fever, Typhus-miteborne), these diseases may constitute a significant risk due to exposure to biting vectors. For water contact diseases (Leptospirosis) activities involving extensive contact with surface water increase risk. For respiratory diseases (Tuberculosis (TB)), personnel in close-quarter conditions could have been at risk for person-to-person spread. Animal contact diseases (Rabies, Anthrax, Q fever), pose year-round risk. For venomous insects and animals, if encountered, effects of venom vary with species from mild localized swelling to potentially lethal effects. For PM₁₀, PM_{2.5}, and exposure to burn pits, exposures may result in mild to more serious short-term health effects (e.g., eye, nose or throat and lung irritation) in some personnel while at this site. For PM₁₀ 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 effects from exposure to particulate matter and to burn pits 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 Bagram Air Field. Personnel who reported with symptoms or required treatment while at this site should have exposure/treatment noted in medical record on a standard form (SF) 600 *Chronological Record of Medical Care*.

Long-term health risks and medical implications:

The hazards associated with potential long-term health effects at Bagram Air Field include inhalable fine particulate matter less than 2.5 micrometers in diameter (PM_{2.5}). It is considered possible that 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 could potentially 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 still consider overall individual health status (e.g., any underlying conditions/susceptibilities) and any potential unique individual exposures (such as burn pits, or 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).

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 2 of 24)

POEMS
Table 1. Population-Based Health Risk Estimates—Bagram Air Field, Afghanistan ^{1,2}

Sources of Identified Health Risk ³	Health Risk Assessment Summary ⁴	
	Short Term Health Risk	Long Term Health Risks
AIR	Airborne Substances—Overall Short Term Risks:	Airborne Substance—Overall Long-Term Risks:
Particulate matter less than 10 micrometers in diameter (PM ₁₀)	Low to High: Daily levels vary, acute (short term) health effects (e.g., upper respiratory tract irritation) more pronounced during peak days. More serious effects are possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).	Not evaluated-no available health guidelines.
Particulate matter less than 2.5 micrometers in diameter (PM _{2.5})	Low to High: Moderate short-term health risks for typical exposures, and low to high health risks for peak exposures. 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.	Low to moderate: Small percentage of persons may be at increased risk for developing chronic conditions (particularly those more susceptible to acute (short term) effects (e.g., those with asthma/existing respiratory diseases).
Metals	Low: Cadmium was detected sporadically between 2005 and 2007 at levels that did not pose a significant risk (low).	Low: Cobalt was detected sporadically between 2005 and 2007 at levels that did not pose a significant risk (low).
ENDEMIC DISEASE	Endemic Disease—Overall Short Term Risks:	Endemic Disease—Overall Long Term Risks
FOOD BORNE/WATERBORNE (E.G., DIARRHEA-BACTERIOLOGICAL)	Moderate to High: High (bacterial diarrhea, hepatitis A, typhoid fever) to Moderate (diarrhea-cholera, diarrhea- protozoal, 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). Risk reduced to None with preventive medicine measures, which include Hepatitis A and Typhoid fever vaccination, and consumption of food and water only from approved sources.	None identified.
ARTHROPOD VECTOR BORNE	Low to Moderate: Moderate for Leishmaniasis-cutaneous, Crimean-Congo hemorrhagic fever, Sandfly fever, typhus-miteborne; and Low for malaria, the Plague, and West Nile fever. Risk reduced to low by proper wear of the uniform and application of repellent to exposed skin.	Low for the visceral leishmaniasis.
Respiratory	Low to Moderate: Moderate for tuberculosis to Low for meningococcal meningitis.	None identified based on available data. TB is evaluated as part of the Post Deployment Health Assessment.
Water-Contact (e.g. wading, swimming)	Moderate for Leptospirosis.	None identified based on available data.
Animal Contact	Low to Moderate: Moderate for rabies, anthrax, Q-fever; to Low short-term risk (due to rare occurrence) for H5N1 avian influenza.	None identified based on available data.
VENOMOUS ANIMAL/INSECTS	Venomous Animals/Insects—Overall Short Term Risks:	Venomous Animals/Insects—Overall Long Term Risks:
Snakes, scorpions, and spiders	Low to High: If encountered, effects of venom vary with species from mild localized swelling (e.g. widow spider) to potentially lethal effects (e.g. saw-scaled viper).	None identified.
HEAT/COLD STRESS	Heat/Cold—Overall Short Term Risks:	Heat/Cold—Overall Long Term Risks:
Heat	Moderate: Moderate risk of heat injury in summer months for unacclimatized personnel. Risk of heat injury is reduced through preventive measures.	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.
NOISE	Noise—Overall Short Term Risks:	Noise—Overall Long Term Risks:
Continuous	Low with appropriate use of hearing personal protective equipment (PPE).	Low to Moderate: Low with appropriate use of hearing PPE. When protective measures are not used risk of long-term irreversible effects are increased to moderate.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 3 of 24)

UNIQUE INCIDENT/CONCERNS	Unique Incident/Concerns—Overall Short-Term Risk:	Unique Incident/Concerns—Overall Long-Term Risk:
Burn Pit Evaluation	Airborne Substances—Overall Short Term Risks:	Airborne Substances—Overall Long-Term Risks:
Particulate matter (PM ₁₀)	<p>Low to High: Low short-term health risks for typical exposures, and high short-term health risks for peak exposures. Personnel may have experienced notable eye, nose, and throat irritation and some respiratory effects. More serious effects are possible in susceptible persons (e.g., those with asthma/existing respiratory diseases).</p>	<p>Not evaluated-no available health guidelines.</p>
Particulate matter (PM _{2.5})	<p>Low to Moderate: Low to moderate short-term health risks for typical exposures and moderate for peak exposures. Personnel may experience notable eye, nose, and throat irritation and some respiratory effects. More serious effects are possible in susceptible persons (e.g., those with asthma/existing respiratory diseases)</p>	<p>Moderate: Small percentage of persons may be at increased risk for developing chronic conditions (particularly those more susceptible to acute (short term) effects (e.g., those with asthma/existing respiratory diseases)</p>
<p>¹ This Summary Table provides a qualitative estimate of population-based short- and long-term health risks associated with the general ambient and occupational environment conditions at BAF. It does not represent a unique individual exposure profile. Actual individual exposures and health effects depend on many variables. For example, while a chemical may be present in the environment, if a person does not inhale, ingest, or contact a specific dose of the chemical for adequate duration and frequency, then there may be no health risk. Alternatively, a person at a specific location may experience a unique exposure—such as at the burn pit, which has been reported at this site—which could result in a significant individual exposure. Any such person seeking medical care should have their specific exposure documented in an SF 600.</p> <p>² This assessment is based on specific data and reports obtained from the January 2002 through October 2010 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.</p> <p>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 BAF. 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 the APHC/AIPH. 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.</p> <p>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.</p>		

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 4 of 24)

1 Discussion of Health Risks at Bagram Air Field, Afghanistan by Source

The following sections describe the major source categories of potential health risk that were evaluated at Bagram Air Field (BAF). 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 sections may include 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.

2 Air

2.1 Site-Specific Sources Identified

Vehicle emissions are considered a major contributor to air pollution in the city of Bagram, which has a population of over 75,000 people. Most of these vehicles are over 10 years old, and generally use substandard fuels. Some of the more common industries burn tire rubber, plastic waste and other combustibles as cheap energy sources (e.g. brick factories). Additionally, rationed power exacerbates the situation as it forces people to use more polluting fuel sources such as wood, coal and heating oil for cooking and heating. As of 2010, additional emissions from military operations include approximately 59 power generators (using 109,000 liters (L)/day of JP-8), vehicular traffic, a medical waste incinerator, waste burning (burn pit and burn boxes), and other local sources will also contribute to the ambient environment at these locations (see reference 7).

This assessment focused on two exposure zones, ambient conditions, and areas near fuel areas (petroleum distribution points and storage) as indicated through sampling records.

2.2 Particulate matter, 10 microns (PM₁₀)

2.2.1 Sample data/Notes:

Exposure Guidelines:

Short Term (24-hour) PM₁₀ (µg/m³): Negligible MEG=250, Marginal MEG=420, Critical MEG=600,
Long-term PM₁₀ MEG (µg/m³): Not Available.

The risk assessment was based on 448 ambient condition samples (2002–2010), and 8 fuel area samples (2007). The range of 24-hour PM₁₀ concentrations in 456 samples overall from January 2002–September 2010 was 4 to 1416 µg/m³ with an average concentration of 302 µg/m³.

2.2.2 Short-term health risk:

Variable (Low to High): Results of data analyses show low to moderate short-term health risks for typical exposures, and low to high risks for peak exposures. For 57 percent of the time during this period the PM₁₀ daily risk levels indicated there was no hazard. Other daily risk levels observed during this time were low (27 percent), moderate (9 percent) and high (7 percent). Confidence in risk assessment is low to medium (TG 230 Table 3-6). Elevated daily risk levels (moderate to high) possibly associated with acute health effects occurred 16 percent of the time. A small percentage of personnel may experience notable eye, nose, and throat irritation; most personnel will experience only mild effects. Pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 5 of 24)

2.2.3 Long-term health risk:

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

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

2.3.1 Sample data/Notes:

Exposure Guidelines:

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

The risk assessment is based on 441 ambient condition samples (2005–2010), and 8 fuel area samples (2007). The range of 24-hour PM_{2.5} concentrations in these samples from December 2005–September 2010 was 14 to 1967 µg/m³ with an average concentration of 105 µg/m³.

2.3.2 Short-term health risk:

Variable (Low to High): Results of data analyses show low to moderate short-term health risks for typical exposures, and low to high health risks for peak exposures. For 35 percent of the time during this period, PM_{2.5} daily risk levels indicated there was no hazard. Other risk daily risk levels observed during this time were low (64 percent) and moderate (1 percent). Confidence in risk assessment is low to medium (TG 230 Table 3-6). A small percentage of personnel may experience notable eye, nose, and throat irritation; most personnel will experience only mild effects. Pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.

2.3.3 Long-term health risk:

Variable (Low to Moderate): Results of data (2005–2010) show there was low to moderate long-term risk levels associated with PM_{2.5} concentrations. Confidence was low to medium for risk assessments (TG 230 Table 3-6). Repeated exposures above this level may increase the risk for development of chronic health conditions such as reduced lung function or exacerbated chronic bronchitis, chronic obstructive pulmonary disease (COPD), asthma, atherosclerosis, or other cardiopulmonary diseases could occur in generally healthy troops. Those with a history of asthma or cardiopulmonary disease have a higher risk for developing these chronic conditions. Confidence in risk estimate is low due to limitations in field data and health effects data (TG 230 Table 3-6).

2.4 Airborne Metals (PM₁₀)

2.4.1 Sample data/Notes:

The risk assessment was performed using 223 ambient condition samples (2002–2010), and 8 fuel area samples (2007). Cadmium and cobalt were sporadically detected in 22 samples during this period, but were at levels that posed low risk.

2.4.2 Short-term health risk:

Low: Cadmium (2005–2007) data show low short-term health risk from peak exposure concentration of 0.031 micrograms per cubic meter (ug/m³) which exceeds the short term negligible MEG of 0.0205 ug/m³. Confidence for risk assessments was medium (TG 230 Table 3-6). Average exposure concentration (0.0058 ug/m³) was below the short term negligible MEG and was not considered a potential hazard.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 6 of 24)

2.4.3 Long-term health risk:

Low: Cobalt (2005–2007) data show low long-term health risks from average exposure concentration of $0.0.0007 \text{ ug/m}^3$ which exceeded the long term negligible MEG of $5.33 \text{ E }^{-7} \text{ ug/m}^3$. Confidence for risk assessments was medium (TG 230 Table 3-6). Low risk hazards are expected to have little or no impact on mission readiness.

2.5 Volatile Organic Compounds (VOC)

2.5.1 Sample data/Notes:

The risk assessment was performed using 11 ambient condition samples (2007, 2008, 2010), 8 fuel area samples (2002, 2010). None of the analyzed volatile organic chemical (VOC) pollutants was found at concentrations above short-term MEGs, and only acrolein concentration (3.67 ug/m^3) exceeded the long-term 1 year negligible MEG (0.137 ug/m^3). However, MEGs are not available for all analytes detected and the risk may be underestimated. Additionally, some chemicals were not evaluated. This may also influence the uncertainty in these conclusions.

2.5.2 Short-term health risk:

None identified based on available sampling data. For some analytes (beryllium, cadmium, and vanadium), the analytical limit of quantitation (LOQ) was above the military exposure guidelines, which may cause inaccurate population exposure point concentrations, and as a result, the risk may be underestimated.

2.5.3 Long-term health risk:

Because acrolein was only detected in a single sample on 29 December 2007, a risk assessment for exposure to this chemical was not possible. The average concentration of 3.67 ug/m^3 was calculated from three valid samples (the two non-detect samples used j coded values) and was greater than the 1 year negligible MEG of 0.137 ug/m^3 .

3 Soil

3.1 Site-Specific Sources Identified

Twenty three surface soil samples and ten sub surface soil samples were collected at BAF between 1 January 2003 and 31 December 2009. The primary soil contamination exposure pathways are dermal contact and dust inhalation. Contamination sources include PCB's leaking from transformers, sludge and soil contaminated with metals from a former Soviet aircraft maintenance/plating facility, the BAF fuel point, the suspected Soviet-era dumpsites located at the South Fuel Farm and the vortex demining operational area; all of which were sampled. Other sampled areas included the soil near the living quarters of Camp Vance, the Central Receiving and Shipping Point yard, FOB Bermel, Task Force Sabre POL Storage Area, FB Khogyani, FOB Fenty and Heselton.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 7 of 24)

3.2 *Sample data/Notes:*

Typical parameters analyzed for included SVOCs, heavy metals, PCBs, pesticides, herbicides and radionuclides. 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). A majority of samples were collected from areas identified as low exposure areas. 30 percent of the samples collected were sub-surface soil samples, which the general population is not typically exposed to (the exception being engineering/construction personnel).

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:*

Low: None identified based on available sample data. All collected samples were below the 1-year Negligible MEGs, with the exception of a single surface soil sample that was collected from within a former plating facilities building and undergoing remediation. This single sample was not considered representative of soil conditions or exposure at BAF. Confidence is low due to the lack of sufficient quantity and quality of samples collected to provide a health risk to the entire airfield (TG 230 Table 3-6).

4 Water

In order to assess the risk to U.S. personnel from exposure to water in theater, the APHC identified the most probable exposure pathways based on available information. At this time they are primary ingestion sources (a mix of bottled and treated water) and non-drinking. Non-drinking specific exposures sources (such as personal hygiene or food preparation sources) where much less than 5-15 Liters of water are ingested per day (assumed range of military ingestion rates).

4.1 *Drinking Water:*

4.1.1 *Site-Specific Sources Identified*

Bagram Air Field is surrounded by the Hindu-Kush Mountain Range and the snowmelt from the surrounding mountains recharges the base's aquifer. As of 2009, BAF has four ground water wells, all operated by KBR. Two of the wells were located at the North water point, one well was located at the West water point, and one was located at the South water point. A review of Sanitary Surveys from 2003 to February 2005 indicates that most camps used reverse osmosis water purification unit (ROWPU) treated bulk water as their primary source of potable drinking water. From February to April 2006, notes contained in field inspections showed that all camps began to switch to bottled water for their primary drinking source.

4.1.2 *Sample data/Notes:*

To assess the potential for adverse health effects to troops the following assumptions were made: 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 and continuously consumed less than 15L/day for up to 365 days (1-year). It is further assumed that control measures and/or personal protective equipment were not used. Of the 151 treated samples, five were described as ROWPU-treated bulk water drinking samples. The 2004–2005 deployment OEH surveillance samples and

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 8 of 24)

analytical data for BAF that were reported by the Public Health Command Region Europe (PHCR-Europe) were not included due to database conversion issues. The next update to the BAF POEMS will include these data.

4.1.3 Short-term health risk:

Low: Boron was detected in 3 of 3 valid samples in 2007. Peak concentration (1.0 mg/L) exceeded the short-term (14-day) 15L/day MEG of 0.93 mg/L and is considered a low short-term health risk hazard. Confidence is low for risk assessment due to lack of sufficient quantity and quality of samples (TG 230 Table 3-6).

4.1.4 Long-term health risk:

Low: Lead in 2003 was detected with a concentration of 0.063 mg/L from a single sample, which exceeded the long-term (1-year) 15L/day MEG of 0.015 mg/L and is considered low risk chronic hazards. Confidence is low for risk assessment due to lack of sufficient quantity and quality of samples (TG 230 Table 3-6).

4.2 Drinking Water: Bottled or Packaged Water

4.2.1 Site-Specific Sources Identified

From February to April 2006, notes contained in field inspections showed that all camps began to switch from ROWPU to bottled water for their primary drinking source. There were multiple bottled water companies or vendors sampled at BAF. It is important to note that water from a given brand may not be produced or bottled at the same source. Some brands of bottled water come packaged with the same bottle label, but could be from multiple bottling plants and locations that use various water sources and treatment methods.

4.2.2 Sample data/Notes:

To assess the potential for adverse health effects to troops the following assumptions were made: 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 and continuously consumed less than 15L/day of bottled water for up to 365 days (1 year). It is further assumed that control measures and/or personal protective equipment were not used. Of the 151 treated samples, 86 were categorized as samples taken from bottled water sources. Deployment samples from 2004 and 2005 were sent to PHCR-Europe for analyses, and were not available for this POEMS document.

4.2.3 Short-term health risk:

Low: Boron was detected in 8 of 22 valid samples in 2007, and 9 of 10 valid samples in 2008. Peak concentration of Boron in 2007 (1.1 mg/L) and 2008 (1.3 mg/L) exceeded the short-term (14-day) 15L/day MEG of 0.93 mg/L and is considered a low short-term health risk hazard. Confidence for risk assessments was low (TG 230 Table 3-6).

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4.2.4 Long-term health risk:

Low Thallium was detected in 4 of 17 valid samples in 2009. The peak concentration of Thallium (0.01 mg/L) exceeded the long-term (1-year) 15L/day MEG of 0.0003 mg/L and is considered low risk chronic hazards. Confidence for risk assessments was low (TG 230 Table 3-6).

4.3 Non-Drinking Water: ROWPU

4.3.1 Site-Specific Sources Identified

The BAF is surrounded by the Hindu-Kush Mountain Range and the snowmelt from the surrounding mountains recharges the base's aquifer. As of 2009, BAF has four ground water wells, all operated by KBR. Two of the wells are located at the North water point, one well is located at the West water point, and one is located at the South water point. Although the primary route of exposure for most micro-organisms is ingestion of the contaminated water, dermal exposure to some micro-organisms, 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: All U.S. personnel at this location were expected to remain at this site for approximately 1 year. It is further assumed that control measures and/or personal protective equipment were not used. Of the 151 treated water samples, 27 were categorized as treated or disinfected fresh bulk water and were described as either non-drinking, or as secondary drinking sources. All samples categorized as a secondary drinking source were supplying dining facilities on BAF and were used for cooking and cleaning. In case of accidental ingestion of the non-drinking water sources, or in instances of ice production in dining facilities, water is assumed to have been consumed at less than a 1-year 5L/day rate. Deployment samples from 2004 and 2005 were sent to PHCR-Europe for analyses, and were not available for this POEMS document.

4.3.3 Short and long-term health risks:

None identified based on the available sampling data.

4.4 Non-Drinking Water: Untreated

4.4.1 Site-Specific Sources Identified

The BAF is surrounded by the Hindu-Kush Mountain Range and the snowmelt from the surrounding mountains recharges the base's aquifer. As of 2009, BAF has four ground water wells, all operated by KBR. Two of the wells are located at the North water point, one well is located at the West water point, and one is located at the South water point. 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. None of the untreated water samples were characterized or described as drinking water or a secondary drinking source.

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4.4.2 Sample data/Notes:

To assess the potential for adverse health effects to troops the following assumptions were made: All U.S. personnel at this location were expected to remain at this site for approximately 1 year. It is further assumed that control measures and/or personal protective equipment were not used. Of the 151 total samples submitted for BAF, 33 were characterized as untreated samples and were described as water that was used for personal hygiene; vehicle and aircraft wash racks, and dust suppression only. Since untreated water was not being consumed, accidental ingestion of untreated water may have occurred in times of showering or personal hygiene use (e.g. brushing teeth), under which conditions are comparable to a lower, 5L/day ingestion rate, although 5L/day is not typically ingested at such events. Deployment samples from 2004 and 2005 were sent to PHCR-Europe for analyses, and were not available for this POEMS document.

4.4.3 Short-term health risk:

None identified based on the available sampling data.

4.4.4 Long-term health risk:

None identified based on the available sampling data.

5 Military Unique

5.1 Chemical, Biological, Radiological, and Nuclear Weapons

No specific hazard sources documented in the Defense Occupational and Environmental Health Readiness System (DOEHRS) or the DoD Occupational and Environmental Health (OEHS) data Portal from 19 January 2002 to 30 October 2010 or the Environmental Baseline Study.

5.2 Depleted Uranium (DU)

No specific hazard sources documented in the DOEHRS or DoD OEHS Portal from 19 January 2002 to 30 October 2010 or the Environmental Baseline Study.

5.3 Ionizing Radiation

Medical and dental radiography are utilized in the expeditionary medical support (EMEDS) Clinic. Radiology personnel are enrolled in the thermoluminescent dosimetry (TLD) program. Permitted radioactive materials and generally licensed devices are used in chemical, biological, radiological, nuclear, and high-yield explosives detection equipment, moisture density gauges and targeting pods.

Backscatter x-ray systems for screening personnel and/or vehicles at the installation Entry Control Points (ECPs). Two separate systems are in use, one for pedestrians and one for vehicles.

Rapiscan Secure 1000 is a walk-up system used for screening personnel (pedestrians) entering the base. All non-U.S. personnel entering the installation are screened using the Rapiscan. The AS&E Z-Backscatter systems are mounted in two unmarked, nondescript passenger vans operated at ECP 1. The vans are unoccupied and unattended during operations; SFS personnel review the images from an observation post located approximately 50 yards away. Important note: The rapiscan operation at ECP 1 has been repositioned as of February 2011, and is no longer considered a health risk hazard (TF44-MED 2011).

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5.3.1 Short-term health risks:

None identified based on the available data.

5.3.1 Long-term health risks:

Low: As currently configured, radiation exposure is insignificant for Z-Backscatter van operators, as well, as the Rapiscan operators at entry control point (ECP) 3. At ECP 1, Rapiscan operations may potentially expose personnel to radiation levels that approach the general public dose limit over the course of a 6-month deployment. Although no exposure limits were exceeded, the "As Low As Reasonably Achievable" ALARA principle applies. Long-term health risk is considered low. Confidence for risk assessments was low (TG 230 Table 3-6).

5.4 Non-Ionizing Radiation

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

6 Endemic Disease¹

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 Afghanistan dated 14 June 2010. This document lists the endemic disease reported in the region, its specific risks and severity and general health information about the disease. The general information on meningococcal meningitis on how it is transmitted from person to person came from the WHO Fact Sheet No. 141 on Meningococcal Meningitis.

6.1 Foodborne and Waterborne Diseases

Food borne and waterborne diseases in the area are transmitted through the consumption of local food and water. Sanitation is extremely poor throughout the country, including 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. Effective disease surveillance does not exist within the country. Only a small fraction of diseases are identified or reported. 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). Risk reduced to none with preventive medicine measures, which include Hepatitis A and Typhoid fever vaccination, and consumption of food and water only from approved sources. Key disease risks are summarized below:

6.1.1 Diarrheal diseases (bacteriological)

Diarrheal diseases can be expected to temporarily incapacitate a very high percentage of personnel (potentially over 50 percent per month) within days if local food, water, or ice is consumed. Field conditions (including lack of hand washing and primitive sanitation) may facilitate person-to-person spread and epidemics. Typically mild disease treated in outpatient setting; recovery and return to duty in less than 72 hours with appropriate therapy. A small proportion of infections may require greater than 72 hours limited duty, or hospitalization.

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

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6.1.2 Hepatitis A, typhoid fever, and diarrhea-protozoal

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 percent 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. Although much rarer, other potential diseases in this area that are considered a moderate risk include: Hepatitis E, diarrhea-cholera, and brucellosis.

6.1.3 Short-term Health Risks:

Moderate to high: The overall short-term risk associated with Food borne and Waterborne diseases at BAF is considered High (for bacterial diarrhea, hepatitis A, typhoid fever) to Moderate (for diarrhea-cholera, brucellosis, hepatitis E) if local food or water is consumed. Preventive Medicine measures such as vaccinations reduce the risk estimate to none (for Hepatitis A and Typhoid fever). Additionally, U.S. Forces are provided food and water from approved sources. Confidence in risk estimate is medium (TG 230 Table 3-6).

6.1.4 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. Malaria, the major vector-borne risk in Afghanistan, is capable of debilitating a high percentage of personnel for up to a week or more. In addition, other vector-borne diseases are transmitted at low or unknown levels and may constitute a significant risk.

6.2.1 Malaria

Malaria incidents are often associated with the presence of agriculture activity, including irrigation systems, which provide breeding habitats for vectors. In the Parwan province, small number of cases (less than 1 percent per month attack rate) could occur among personnel exposed to mosquito (*Anopheles* spp.) bites. Malaria incidents can cause debilitating febrile illness typically requiring 1 to 7 days of inpatient care, followed by return to duty. Severe cases may require intensive care or prolonged convalescence, and fatalities can occur. Note: antimalarials are required for U.S. personnel deploying to Afghanistan.

6.2.2 Leishmaniasis

Leishmaniasis is transmitted by sand flies. The disease risk is highest when sand flies are most prevalent in March through November. 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 can be disfiguring. Visceral leishmaniasis causes a severe febrile illness which typically requires hospitalization with convalescence over 7 days.

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6.2.3 *Crimean-Congo hemorrhagic fever*

Crimean-Congo hemorrhagic fever occurs in rare cases and is transmitted by tick bites or occupational contact with blood or secretions from infected animals or personnel. It is a very severe illness typically requiring intensive care with fatality rates from five to fifty percent. The risk is moderate, but cases are rare. Risk reduced to low by proper wear of the uniform and application of repellent to exposed skin.

6.2.4 *Sandfly fever*

Sandfly fever has a moderate risk although it is estimated that potential disease rates are from 1 percent to 10 percent of personnel could be affected per month under worst case conditions. It is transmitted by sandflies and occurs more commonly in children though adults still at risk. Incidents can result in debilitating febrile illness typically requiring 1–7 days of supportive care followed by return to duty. Risk reduced to low by proper wear of the uniform and application of repellent to exposed skin.

6.2.5 *Plague*

Plague is present in rare cases and typically occurs in more urban areas. It is reservoired by rats and transmitted by their flea populations; this disease is associated with a low risk estimate. Incidents can result in potentially severe illness which may require more than 7 days of hospitalization and convalescence.

6.2.6 *Typhus-miteborne*

Typhus-miteborne has a moderate risk estimate although it is estimated that potential disease rates from 1 to 10 percent of personnel could be affected per month under worst case conditions. The disease is transmitted by the larval stage of trombiculid mites (chiggers), which are typically found in areas of grassy or scrubby vegetation. The disease can cause debilitating febrile illness typically requiring 1 to 7 days of inpatient care, followed by return to duty.

6.2.7 *West Nile virus*

West Nile virus is present and is maintained by the bird population and mosquitoes that help to transfer the diseases from birds to humans. The majority of infections in young, healthy adults are asymptomatic although it can result in fever, headache, tiredness, and body aches, occasionally with a skin rash (on the trunk of the body) and swollen lymph glands. This disease is associated with a low risk estimate.

6.2.8 *Short-term health risks:*

Moderate (for Leishmaniasis-cutaneous (acute), Crimean-Congo hemorrhagic fever, Sandfly fever, typhus-miteborne; and Low for malaria, the Plague and West Nile fever. Risk reduced to low by proper wear of the uniform and application of repellent to exposed skin. Confidence in risk estimate is medium (TG 230 Table 3-6).

6.2.9 *Long-term health risks:*

Low (for the visceral [chronic] leishmaniasis). Confidence in risk estimate is medium (TG 230 Table 3-6).

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 14 of 24)

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 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.

6.3.1 *Leptospirosis*

Leptospirosis is present in Afghanistan, 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, Leptospirosis present in the soil pass directly into surface waters. Leptospirosis can enter the body through cut or abraded skin, mucous membranes, and conjunctivae. Ingestion of contaminated water can also lead to infection. The acute generalized illness associated with infection can mimic other tropical diseases (for example, dengue fever, malaria, and typhus), and common symptoms include fever, chills, myalgia, nausea, diarrhea, cough, and conjunctival suffusion. Manifestations of severe disease can include jaundice, renal failure, hemorrhage, pneumonitis, and hemodynamic collapse. Recreational activities involving extensive water contact may result in personnel being temporarily debilitated with leptospirosis.

6.3.2 *Short-term health risks:*

Moderate (for Leptospirosis). Confidence in risk estimate is medium (TG 230 Table 3-6).

6.3.3 *Long-term health risks:*

None identified based on available data.

6.4 Respiratory Diseases

6.4.1 *Tuberculosis (TB)*

Tuberculosis (TB) poses a moderate year round risk to U.S. personnel in Bagram, Afghanistan. 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. TB is evaluated as part of the Post-Deployment Health Assessment.

6.4.2 *Meningococcal meningitis*

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.

6.4.3 *Short-term health risks:*

Moderate (for tuberculosis) to Low (for meningococcal meningitis). Confidence in risk estimate is medium (TG 230 Table 3-6).

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 15 of 24)

Long-term health risks:

None identified based on available data.

6.5 Animal-Contact Diseases

6.5.1 Rabies

Rabies poses a year round moderate risk. Occurrence is well above U.S. levels due to the lack of organized control programs and the presence of feral animals. Dogs are the primary sources of human exposure to rabies in Afghanistan, and canine rabies is the most common rabies strain. Rabies is transmitted by exposure to the virus-laden saliva of an infected animal, typically through bites, but could occur from scratches contaminated with the saliva.

6.5.2 Anthrax

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.

6.5.3 Q-Fever

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

6.5.4 H5N1 avian influenza

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.

6.5.5 Short-term health risks:

Variable (Low to Moderate): Low (for H5N1 avian influenza) short-term risk due to rare occurrence to Moderate (for rabies, anthrax, Q-fever). Confidence in risk estimate is medium (TG 230 Table 3-6).

6.5.6 Long-term health risks:

None identified based on available data.

7 Venomous Animal/Insect

The species listed below have home ranges that overlap the location of BAF, and may present a health risk if they are encountered by personnel. Control of insect and arthropod vectors has occurred only on a seasonal (March–November) basis and involved no more than 3–4 focused (fractions of an acre) pesticide interventions on an annual basis. See section 9 for more information about pesticides and pest control measures.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 16 of 24)

7.1 Spiders

- *Latrodectus dahlia* (widow spider): Venom effects are mostly minor and even significant envenoming is unlikely to be lethal.

7.2 Scorpions

- *Afghanobuthus naumanni*: Stings by these scorpions are likely to cause only short lived local effects, such as pain, without systemic effects.
- *Androctonus afghan*, *Androctonus amoreux*, and *Androctonus baluchicus*: Severe envenoming possible, potentially lethal; venom may produce direct or indirect cardio toxicity.
- *Compsobuthus rugosulus*, and *Compsobuthus tofti*: Severe envenoming possible, potential lethality and systemic effects unknown.
- *Hottentotta alticola*, *Hottentotta saulcyi*: Moderate envenoming possible, but unlikely to prove lethal.
- *Mesobuthus caucasicus*, *Mesobuthus eupeus*, and *Mesobuthus macmahoni*: Stings by these scorpions are likely to cause only short lived local effects, such as pain, without systemic effects.
- *Orthochirus afghanus*, *Orthochirus bicolor*, *Orthochirus jalalabadensis*, *Orthochirus pallidus*, *Orthochirus samrchelsis*, and *Orthochirus scrobiculosus*: Severe envenoming possible, potential lethality and systemic effects unknown.

7.3 Snakes

- *Boiga trigonata* (Common Cat Snake), *Hemorrhis ravergeri* (Spotted Whip Snake), and *Telescopus rhinopoma* (Indian Desert Cat Snake): Mild venom: most likely minor local pain and swelling only.
- *Echis multisquamatus* (Central Asian Saw-Scaled Viper), *Echis sochureki* (Sochurek's Saw-Scaled Viper), *Macrovipera lebetina turanica* (Levantine Viper): Severe envenoming possible, potentially lethal; venom has coagulopathic and hemorrhagic effects.
- *Gloydius halys* (Haly's Pit Viper): Severe envenoming possible, potentially lethal; venom has coagulopathic, with secondary renal damage.
- *Naja oxiana* (Oxus cobra): Severe envenoming possible, potentially lethal; venom causes moderate to severe neurotoxic paralysis.

7.4 Short-term health risk:

Low: If encountered, effects of venom vary with species from mild localized swelling (e.g. widow spider) to potentially lethal effects (e.g. saw-scaled viper). See effects of venom above.

7.5 Long-term health risk:

None identified.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 17 of 24)

8 Heat/Cold Stress

The BAF is located at 1500 m above sea level. Precipitation is concentrated in the winter (snow) and spring months. Summers are long and hot (temperatures range from 70–91 °F), but have very low humidity. Fall (October and November) is warm and dry. Winters are cold, but short, lasting from December to March (temperature range: 19–50 °F). Spring in Bagram starts in late March and is the wettest time of the year.

8.1 Heat

8.1.1 Short-term health risk:

Moderate: Moderate risk of heat injury in unacclimatized personnel. Risk of heat injury is reduced through preventive measures. Confidence in risk assessment is low (TG 230 Table 3-6).

8.1.2 Long-term health risk:

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. Long-term health implications from heat injuries are rare, but can occur, especially from more serious injuries such as heat stroke. It is possible that high heat in conjunction with various chemical exposures can increase long-term health risks, though specific scientific evidence is not conclusive. Confidence in these risk estimates is medium (TG 230 Table 3-6).

8.2 Cold

8.2.1 Short and long-term health risks:

Low: The risk of cold injury is low. Confidence in this risk estimate is Medium (TG 230 Table 3-6).

9 Noise

9.1 Continuous

Aircraft operations have the potential to cause significant noise hazard to flight line support personnel. Especially during intermediate and full power runs of fixed wing aircraft (e.g. F-15 and F-16 engine test). Because of the potential noise hazard inherent in flight line operations, personnel are required to wear dual hearing protection when working on the flight line and are enrolled in the Hearing Conservation Program. Personal noise dosimetry was performed on 3 November 2010 to measure ground technician exposure during engine run-ups. Most sustained engine run events were identified below 110 dBA, which do not present a significant hazard when double hearing protection is worn. For example, the effective noise reduction rate (NRR) of 22 dBA, when double hearing protection is worn, will reduce 110 dBA to 88 dBA which has a 4-hour exposure limit per day). Extreme noise events during engine runs (intermediate and full-power runs) produced sustained dBA of 123.6 (14 minute exposure) and 135.1 decibels (dBA) (32 minute exposure) and may have exceeded the dosimeter upper measurement limit of 140 dBA. Existing control (double hearing protection) is inadequate to fully protect personnel against noise hazard during these extreme events (Air Force Occupational Safety and Health Standard 2006).

Personnel residing in close proximity to the generator in the sleep tent area will routinely be exposed to noise levels as high as 82.0 dBA. Although this is below the 85 dBA threshold requiring hearing protection, it still presents a concern for hearing conservation.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 18 of 24)

9.1.1 Short-term health risk:

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 (TG 230 Table 3-6).

9.1.2 Long-term health risk:

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 (TG 230 Table 3-6).

9.2 Impulse

9.2.1 Short-term and Long-term health risks:

No impulse noise evaluations located, hazard not evaluated for this POEMS.

10 Other Unique Occupational Hazards

10.1 Asbestos

Asbestos containing materials (ACMs) are common in east Europe, Indian subcontinent, and Asia because it is a very good thermal insulator, fire retardant and binder in friction products, and they are inexpensive to make. If the ACM is not friable then the asbestos does not present a significant hazard. However without proper controls, ACM does present an elevated risk to soldiers if it is in poor condition, friable, or if the material is disturbed, such as in maintenance operation or renovation and demolitions. Asbestos can also present a risk to the GI track if it is ingested.

Heating vat liners in Bldg 365 contained 20 percent asbestos and are considered ACM. These rooms are sealed off and only preventive medicine personnel are authorized to break the seal and enter. Asbestos was also found in material piles in the vicinity of bldg 820 on 26 August 2003.

10.1.1 Short-term health risk:

None identified.

10.1.2 Long-term health risk:

Low: Long term health risk from asbestos exposure is low. Confidence in risk assessment is low (TG 230 Table 3-6).

10.2 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 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

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 19 of 24)

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 associated with the highest risk.

10.2.1 Short-term and Long-term health risks:

None identified

10.3 Pesticides/Pest Control:

The 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, such as enclosed bait stations for rodenticides, various 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. Area-wide aerial or ground fogging pesticide dispersal techniques were not practiced at Bagram Air Field. Several monthly pesticide application reports in the DOEHS Data Portal for BAF (October 2001-December 2009) list the usage of pesticides on the site. For each pesticide product applied during this period, the USEPA approved label has been archived, providing a framework how each pesticide handled and applied (see below).

10.3.1 Rodenticides

Bromadiolone, brodifacoum, bromethalin, diphacinone, and zinc phosphide were used year round to control rodents.

10.3.2 Insecticides

Hydramethylnon, nithiazine, fipronil, imidacloprid, d-trans allethrin, phenothrin, methomyl, beta-cyfluthrin, deltamethrin, and permethrin were used from spring through fall to control ants, wasps, hornets, bees, and filth flies.

Hydramethylnon, pyrethrins, piperonyl butoxide, MGK-264, deltamethrin, (S)-methoprene, Bacillus thuringiensis var. israelensis, beta-cyfluthrin, and fipronil were used 3-4 times/year to control mosquitoes, spiders, cockroaches.

Deltamethrin, pyrethrins, beta-cyfluthrin, lambda-cyhalothrin, piperonyl butoxide, MGK-264, hydramethylnon, fipronil, (S)-hydroprene, and bifenthrin were used 1-2 times/year to control camel spiders, termites, scorpions, bed bugs, mites, crickets, ticks, fleas, pantry pests, silverfish, and birds.

10.3.3 Short-term and Long-term health risks

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

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 20 of 24)

10.4 Burn Pit:

The burn pit and burn boxes are located within the same solid waste yard situated at the northeast periphery of BAF. Northeasterly winds may increase population exposure of emissions from waste burning. These wind directions occur at frequencies greater than 33 percent from May through August with the highest frequencies (41 percent) occurring in July.

At this time, previous studies of personnel assigned to a burn pit location, taken together generally show little or no health impact, at the population level, several years post-deployment on the long-term health of personnel. However, The DoD does recognize that acute symptoms due to smoke exposure may occur, including reddened eyes, irritated respiratory passages, and cough that may persist for some time. While no long-term health risks have yet been identified at a population-level, it is plausible that a smaller number of Service members may be affected by longer-term health effects, possibly due to combined exposures (such as sand/dust, industrial pollutants, tobacco, smoke, and other agents) and individual susceptibilities such as preexisting health conditions or genetic factors.

10.4.1 Particulate matter, 10 microns (PM₁₀)

Sample data/Notes:

Exposure Guidelines:

Short Term (24-hour) PM₁₀ (µg/m³): Negligible MEG=250, Marginal MEG=420, Critical MEG=600,
Long-term PM₁₀ MEG (µg/m³): Not Available.

The risk assessment was based on 31 samples taken near the burn pit from 2004, 2009, and 2010. The range of 24-hour PM₁₀ concentrations was 39 to 1002 µg/m³ with an average concentration of 368 µg/m³.

10.4.1.1 Short-term health risk:

Variable (Low to High): Results of data analyses show low short-term health risks for typical exposures, and high short-term health risks for peak exposures. For 37 percent of the time during this period the PM₁₀ daily risk levels indicated there was no hazard. Other daily risk levels observed during this time were low (33 percent), moderate (13 percent), and high (17 percent). Confidence in risk assessment is low to medium (TG 230 Table 3-6). Elevated daily risk levels (moderate to high) possibly associated with acute health effects occurred 30 percent of the time. A small percentage of personnel may experience notable eye, nose, and throat irritation; most personnel will experience only mild effects. Pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.

10.4.1.2 Long-term health risk:

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

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

Sample data/Notes:

Exposure Guidelines:

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

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 21 of 24)

The risk assessment is based on 20 samples taken near the burn pit from 2009, and 2010. The range of 24-hour PM_{2.5} concentrations in these samples was 19 to 350 µg/m³ with an average concentration of 150 µg/m³.

10.4.2.1 Short-term health risk:

Variable (Low to Moderate): Results of data analyses show low to moderate short-term health risks for typical exposures and moderate for peak exposures. For 28 percent of the time during this period, PM_{2.5} levels indicated there was no hazard. Other risk levels observed during this time were low (67 percent) and moderate (1 percent). Confidence in risk assessment is low to medium (TG 230 Table 3-6). Elevated daily risk levels (moderate) that may have been associated with transient acute health effects occurred 1 percent of the time. A small percentage of personnel may experience notable eye, nose, and throat irritation; most personnel will experience only mild effects. Pre-existing health conditions (e.g., asthma, or cardiopulmonary diseases) may be exacerbated.

10.4.2.1 Long-term health risk:

Moderate: Results of data show there was a moderate long-term risk levels associated with PM_{2.5} concentrations. Confidence was medium for risk assessments (TG 230 Table 3-6). Long-term exposure at PM_{2.5} concentration above 65 mg/m³ may increase the risk for developing chronic health conditions such as reduced lung function or exacerbated chronic bronchitis, chronic obstructive pulmonary disease (COPD), asthma, atherosclerosis, or other cardiopulmonary diseases. Those with a history of asthma or cardiopulmonary disease are considered to be at particular risk.

10.4.3 Airborne Metals (PM₁₀)

Sample data/Notes:

Degree of risk is estimated based on comparison of metals results from 25 total air samples to specified MEGs. Samples were taken from 2004, 2009, and 2010. None of the analyzed metals in the samples were found at concentrations above a short- or long-term MEG during the pre-screen.

10.4.3.1 Short and Long-term health risk:

None identified based on available data.

10.4.4 Volatile Organic Compounds (VOC)

10.4.4.1 Sample data/Notes:

The risk assessment was performed using 19 burn pit related samples from 2010. None of the analyzed volatile organic chemical (VOC) pollutants was found at concentrations above short-term MEGs. However, MEGs are not available for all analytes detected so the risk may be underestimated. Additionally, some chemicals were not evaluated. This may also influence the uncertainty in these conclusions.

10.4.4.2 Short-term health risk:

None identified based on available sampling data.

10.4.4.3 Long-term health risk:

None identified based on available sampling data.

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 22 of 24)

10.5 Bagram Theater Internment Facility (BTIF)

The Bagram Theater Internment Facility (BTIF) is a United States detention facility constructed in 2002 at BAF. It was formerly known as the Bagram Collection Point. The facility initially used (from 2002 to late 2009) for the BTIF was an old Soviet warehouse/hangar. In addition to housing prisoners some areas of the warehouse were constructed and used as administration areas and offices for U.S. personnel supporting the facility. Exposure concerns resulting from the conditions of the old warehouse resulted in several years (2004–2008) of environmental and occupational sampling within the facility to assess potential health risk to personnel working in the facility. All identified contaminants were evaluated and determined to present low risk. Preventive medicine personnel summarized this information for inclusion in the medical records of personnel working at the facility. After September 2009, prisoners were transferred to a newly constructed facility. Although the new facility is near the previous facility, DoD sources sometimes refer to it as the Detention Facility In Parwan (DFIP) though some also refer to the new facility as BTIF.

11 References²

1. Air Force Occupational Safety and Health Standard 48-20. Aerospace Medicine. Occupational Noise and Hearing Conservation Program. 30 June 2006.
2. Casarett and Doull's Toxicology: the Basic Science of Exposures, Chapter 2- Principles of Toxicology; Fifth Edition, McGraw Hill, New York.
3. Defense Occupational and Environmental Health Readiness System (referred to as the DOEHS-EH database) at <https://doehrs-ih.csd.disa.mil/Doehrs/>. Department of Defense (DoD) instruction 6490.03, *Deployment Health*, 2006.
4. DoDI 6055.05, Occupational and Environmental Health, 2008.
5. DoD Military Exposure Surveillance Library : <https://mesl.apgea.army.mil/mesl/>. Some of the data and reports used may be classified or otherwise have some restricted distribution.
6. Joint Chiefs of Staff memorandum MCM 0028-07, Procedures for Deployment Health Surveillance, 2007.
7. National Center for Medical Intelligence (NCMI), <https://www.intelink.gov/ncmi/index.php>.
8. USA TF44-MED. 12 May 2011. MEMORANDUM FOR USCENCOM CCSG-AA. Subject: Radiation Hazard Evaluation, Bagram Air Field Pedestrian Screening System Entry Control Point 1, 11 May 2011.

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

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 23 of 24)

9. USAPHC Technical Guide 230, Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel, June 2010 Revision,
10. USACHPPM 2008 Particulate Matter Factsheet; 64-009-0708, 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 DoD Force Health Protection and Readiness (FHP&R).

Army Institute of Public Health Phone: (800) 222-9698. <http://phc.amedd.army.mil/>

Navy and Marine Corps Public Health Center (NMCPHC) (formerly NEHC) Phone: (757) 953-0700. <http://www-nmcphc.med.navy.mil/>

U.S. Air Force School of Aerospace Medicine (USAFSAM) (formerly AFIOH) Phone: (888) 232-3764. <http://www.wpafb.af.mil/afrl/711hpw/usafsam.asp>

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

Figure D-1. Periodic Occupational and Environmental Monitoring Summary Military Deployment Example (Sheet 24 of 24)

REFERENCES

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

A Strategy for Assessing and Managing Occupational Exposures, AIHA Press, 3rd Ed., Fairfax, VA, 2006

Air Force Manual 48-154, Occupational and Environmental Health Site Assessment, 28 March 2007

Air Force Occupational Safety and Health Standard 48-20, Aerospace Medicine. Occupational Noise and Hearing Conservation Program, 30 June 2006

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

Central Command Regulation 220-1, Deployment Health Surveillance and Force Health Protection, 24 February 2010

DOD Industrial Hygiene Working Group Report 2000-1, "DOD Industrial Hygiene Exposure Assessment Model," 2000

DODI 6055.05, Occupational and Environmental Health (OEH), 11 November 2008

DODI 6055.1, DOD Safety and Occupational Health (SOH) Program, August 1998

DODI 6490.03, Deployment Health, 11 August 2006

EPA, Guidance on Systematic Planning Using the Data Quality Objective Process, EPA QA/G-4, February 2006

MCM 0028-07, Procedures for Deployment Health Surveillance, 02 November 2007

Presidential Review Directive 5, Planning for Health Preparedness and Readjustment of the Military, Veterans, and Their Families after Future Deployments, August 1998

TG 317, Technical Guide for Collection of Environmental Sampling Data Related to Environmental Health Site Assessments for Military Deployments, U.S. Army Institute for Public Health (formerly USACHPPM), February 2009

TM-PM 6490.2, Technical Guide for Collection of Environmental Sampling Data Related to Environmental Health Site Assessments for Military Deployments, Navy and Marine Corps Public Health Center (NMCPHC), December 2008

USA TF44-MED, MEMORANDUM FOR USCENTCOM CCSG-AA, 12 May 2011, Radiation Hazard Evaluation, Bagram Air Field Pedestrian Screening System Entry Control Point 1, 11 May 2011

USAF Bioenvironmental Engineering Field Manual, 20 January 2008

USAFCENT Policy Letter, Occupational and Environmental Health Surveillance and Documentation, 1 February 2011

USAFSAM Occupational and Environmental Health Site Assessment Guidance, Documentation, and Management Technical Guide

Armed Forces Pest Management Board, <http://www.afpmb.org/>

Army Institute of Public Health, <http://phc.amedd.army.mil/>

Army Institute of Public Health—Global Threat Assessment Program (GTAP),
<http://phc.amedd.army.mil/organization/institute/dhrm/Pages/GlobalThreatAssessmentProgram.aspx>,
SIPRNET: <https://phc.army.smil.mil/Pages/GlobalThreatAssessment.aspx>

Army Public Health Command—Europe, <http://www.chppmeur.healthcare.hqusareur.army.mil/>

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

DOD Force Health Protection and Readiness (FHP&R), <http://fhp.osd.mil>

DOD Military Exposure Surveillance Library, <https://mesl.apgea.army.mil/mesl>

Environmental, Safety, and Occupational Health (ESOH) Service Center,
<https://kx.afms.mil/kxweb/dotmil/kj.do?functionalArea=ESOH>

Joint Service OEHSA template, <https://mesl.apgea.army.mil/mesl/doehrsResources/initialize.do>

National Center for Medical Intelligence (NCMI), <https://www.intelink.gov/ncmi/index.php> or SIPRNET:
<https://www.ncmi.dia.smil.mil>

Navy Environmental and Preventive Medicine Unit 2,
<http://www.med.navy.mil/sites/nepmu2/Pages/default.aspx>

Navy Environmental and Preventive Medicine Unit 5,
<http://www.med.navy.mil/sites/nmcsd/nepmu5/Pages/index.htm>

Navy Environmental and Preventive Medicine Unit 6,
<http://www.med.navy.mil/sites/nmcsd/nepmu6/Pages/index.html>

Occupational and Environmental Health Surveillance (OEHS) data portal,
<https://mesl.csd.disa.smil.mil/mesl>

United States Army Public Health Command—Defense Occupational & Environmental Health Readiness System (DOEHRHS) Information,
http://phc.amedd.army.mil/topics/envirohealth/hrasm/Pages/DOEHRHS_Information.aspx or SIPRNET:
<https://doehrs-ih.csd.disa.mil/Doehrs>

U.S. Air Force School of Aerospace Medicine (USAFSAM) (formerly AFIOH),
<http://www.wpaafb.af.mil/afri/711hpw/usafsam.asp>

U.S. Army Institute of Public Health (AIPH),
<http://phc.amedd.army.mil/ORGANIZATION/INSTITUTE/Pages/default.aspx>

U.S. Navy and Marine Corps Public Health Center (NMCPHC), <http://www.nmcphe.med.navy.mil/>

USAPHC Technical Guide 230—Environmental Health Risk Assessment and Chemical Exposure Guidelines for Deployed Military Personnel, June 2010,
http://phc.amedd.army.mil/topics/envirohealth/hrasm/Pages/EHRAP_TechGuide.aspx

GLOSSARY

complete exposure pathway. A determination used by Service preventive medicine personnel stating that all five components of an exposure pathway are present.

conceptual site model (CSM). The defining element of the occupational and environmental health site assessment, it is a compilation of complete and potentially complete exposure pathways for occupational and environmental health threat sources migrating to actual or potential populations at risk at a site.

Defense Occupational and Environmental Health Readiness System (DOEHRS). Joint Services approved information management system used to fully execute, document, and manage the occupational and environmental health site assessment.

environmental medium. The physical environment that surrounds or contacts human beings (e.g., water, soil, air, or other), and through which chemicals or pollutants can move and reach them.

exposure assessment sampling. Sampling to accurately characterize occupational and environmental health exposures to a population at risk supporting health risk assessments and documentation of a Service member's longitudinal exposure records for the particular deployment location and time period.

exposure pathway. The five components that provide exposure to the population at risk: (1) source, (2) environmental medium, (3) health threat, (4) route of exposure, and (5) population affected.

health threat. A composite of ongoing or potential enemy actions; adverse environmental, occupational, and geographic and meteorological conditions; endemic diseases; and employment of nuclear, biological, and chemical weapons (to include weapons of mass destruction) that have the potential to affect the short- or long-term health (including psychological impact) of personnel. (JP 1-02, Source: JP 4-02)

incomplete exposure pathway. A determination used by Service preventive medicine personnel stating that one or more of the five components of an exposure pathway are not present and the pathway is broken.

Joint Service Occupational and Environmental Health Site Assessment Template. The data collection tool used as a guide to identify occupational and environmental health threats at a location and build a comprehensive conceptual model for that deployment site.

periodic occupational and environmental monitoring summary (POEMS). Official Joint Service document that summarizes the DOD medical interpretation of occupational and environmental health exposure data for deployment sites where Service members are operating and may be exposed.

population affected. An individual or a group of human beings whose health is potentially impacted by a health threat.

potentially complete exposure pathway. A determination used by Service preventive medicine personnel stating that it is possible that all five components of an exposure pathway are present.

preliminary hazard assessment (PLHA). The process of reviewing and collecting relevant intelligence data, past hazard assessments, other available predeployment data, and/or on-site occupational and environmental health site assessment activities for the deployment location to identify potential occupational and environmental health threat sources and their relative health risks to a population at risk.

route of exposure. The mode by which the health threat enters or interacts with a human being (e.g., inhalation, ingestion, skin contact, physical, skin absorption, and other).

source. The source is a point or non-point origin of a health threat (e.g., field of buried drums, burn pit, bulk chemical storage, incinerator, RF emitters, fugitive emission from off-site industries, on-site sanding/painting operations, transportation route). The more specific the source information the Service preventive medicine personnel provides, the better.

LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
AIPH	Army Institute of Public Health
AOC	area of concern
ATSDR	Agency for Toxic Substances and Disease Registry
BEE	bioenvironmental engineering
CD-ROM	compact disc read-only memory
CE	civil engineering
COC	chemical of concern
COCOM	combatant command (command authority)
COE	Army Corps of Engineers
CSM	conceptual site model
DCS	deployable cartridge sampler
DOD	Department of Defense
DODI	Department of Defense instruction
DODIH	Department of Defense industrial hygiene
DOEHRS	Defense Occupational and Environmental Health Readiness System
DOL	directorate of logistics
DPS	deployable particulate sampler
DPW	directorate of public works
DQO	data quality objective
DRI	direct reading instrument
EBS	environmental baseline study
EH	environmental health

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EHO	environmental health officer
EMF	expeditionary medical facility
EOHWED	environmental and occupational health workplace exposure data
EPA	Environmental Protection Agency
FHP	force health protection
FOB	forward operating base
GTAP	global threat assessment program
HAZMAT	hazardous materials
HRA	health risk assessment
IAW	in accordance with
ID	identify
JS	Joint Service
JTF	joint task force
MEDIC	medical, environmental, disease, intelligence, and countermeasures
MEG	military exposure guideline
MESL	Military Exposure Surveillance Library
MGRS	military grid reference system
NCMI	National Center for Medical Intelligence
NEHC	Navy Environmental Health Center
NMCPHC	Navy and Marine Corps Public Health Center
NWDC	Navy Warfare Development Command
OEEL	occupational and environmental exposure limits
OEH	occupational and environmental health
OEHED	occupational and environmental health exposure document
OEHS	occupational and environmental health surveillance
OEHSA	occupational and environmental health site assessment
OH	occupational health
OHWED	occupational health workplace exposure data

OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PAR	population at risk
PEL	permissible exposure limit
PLHA	preliminary hazard assessment
PM	particle matter
POEMS	periodic occupational and environmental monitoring summary
PPE	personal protective equipment
QC	quality control
SAP	sampling and analysis plan
SF	standard form
SIPRNET	SECRET Internet Protocol Router Network
SO₂	sulfur dioxide
TB	tuberculosis
TFHPO	theater force health protection officer
TG	technical guide
TM	technical manual
UNEP	United Nations environmental program
U.S.	United States
USA	United States Army
USAF	United States Air Force
USAFSAM	United States Air Force School of Aerospace Medicine
USAPHC	United States Army Public Health Command
USMC	United States Marine Corps
USN	United States Navy
VOC	volatile organic compound
XRF	X-ray fluorescence

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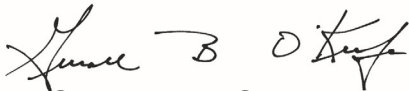
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