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FINAL VERSION

STATEMENT BY

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Chairman Akaka and distinguished members of the committee, thank you for inviting me here today to speak about occupational and environmental health exposures in military operations and the efforts of my organization, U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), in preventing disease and non-battle injuries to our Soldiers and deployed civilian employees.

The USACHPPM is a subordinate command of the U.S. Army Medical Command. USACHPPM's military and civilian personnel are experts in more than 50 public health disciplines. They include occupational and environmental medicine physicians, public health and occupational health nurses, epidemiologists, industrial hygienists, environmental engineers, health risk assessors, chemists, toxicologists and many others. We provide consultative services in these disciplines through a worldwide network, with our headquarters at Aberdeen Proving Ground, Maryland, and five subordinate commands at Landstuhl, Germany; Camp Zama, Japan; Fort George G. Meade, Maryland; Fort Sam Houston, Texas; and Fort Lewis, Washington. Since Operation Desert Storm in 1991, the USACHPPM has been providing technical assistance and support to deployed preventive medicine units and personnel who conduct occupational and environmental health surveillance activities. This continues through our current efforts in support of Operations Iraqi Freedom and Enduring Freedom.

Today, I'd like to speak with you about two specific occupational and environmental health exposures, the potential exposures to sodium dichromate at the Qarmat Ali Water Injection Facility in Iraq and the exposures to smoke from the open burning of solid waste in Iraq, Afghanistan and the Horn of Africa.

QARMAT ALI WATER INJECTION FACILITY

On September 15, 2003, the 1st Battalion, 152nd Infantry from the Indiana National Guard notified the Combined Forces Land Component Command-Surgeon (CFLCC-Surgeon) of its concerns regarding the site contamination at the Qamart Ali Water Injection Facility. The Qamart Ali facility was being repaired as part of Task Force Restore Iraqi Oil (TF-RIO) by an Army

Corps of Engineers contractor. Within a day of notification, the site was placed off-limits and the CFLCC-Surgeon requested assistance from the USACHPPM in assessing the health risks associated with potential exposures to sodium dichromate. By this time, the contractor had started encapsulating the contaminated areas on the site. The DOD Inspector General is currently conducting a review of Army actions regarding the exposure of personnel to sodium dichromate at Qarmat Ali.

On September 30, 2003, a USACH PPM team comprised of an occupational- environmental medicine physician, environmental scientists, engineers, and industrial hygienists arrived at Qarmat Ali and started an Occupational and Environmental Health Survey and Risk Assessment, which they completed on October 24, 2003. This assessment included environmental samples from the soil, air, and living and working areas as well as medical examinations of the Soldiers and Department of Army civilians assigned to the site. No medical exams were provided to civilian contractors because occupational health for contractor employees is the employing contractor's responsibility.

The USACHPPM team conducted environmental soil, air and surface-wipe sampling, to include ambient air monitoring of the location and breathing-zone monitoring of USACH PPM team and military security team members. Soil sample results were below the Military Exposure Guidelines for hexavalent chromium and total chromium in all onsite areas, but were over the guidelines in one off-site area where exposure was not expected. The USACH PPM team recommended that the contractor perform further containment to encapsulate those areas. The average concentrations for hexavalent chromium and total chromium in the air were below the one-year Military Exposure Guidelines. In fact, no hexavalent chromium was detected in any breathing- zone air sample. The survey's surface-wipe sample results for hexavalent chromium dust indicated that the interior of the contractor trailer located at the Qarmat Ali Water Injection Facility compound was contaminated with hexavalent chromium dust. The USACH PPM team recommended moving the trailer to the boundary of the compound and completely decontaminating it.

Medical examinations were administered to 137 of the 161 potentially exposed Soldiers and DOD civilians in the 1st Battalion, 152nd Infantry from the Indiana National Guard and TF-RIO from the U.S. Army Corps of Engineers. There were 14 members who were not available for evaluation and 10 who declined all or part of the testing. The exams were conducted within 30 days of the last potential exposure at the site and within 120 days of site encapsulation. They included administering exposure (i.e., how long, how often a person would have been onsite) and symptom questionnaires as well as specific clinical medical tests tailored to assess chromium exposure. The people who were examined were the people who, according to their answers to the questionnaire, had the most potential for exposure in terms of time frequency and locations visited at the water treatment plant. The Soldiers were there before encapsulation (arriving in June 2003) as well as after encapsulation.

The comprehensive medical exams provided consisted of a medical history, a general physical exam, blood and urine testing (including red blood cell and serum chromium levels, complete blood counts, serum chemistries, liver and renal function tests, and routine urine analysis). Ancillary testing included chest x-rays and spirometry testing. Previously published information

that the Soldiers and DOD civilians only received serum and urine analysis for chromium is incorrect.

Less than 30 percent of the people examined reported symptoms, and the symptoms that were reported were symptoms that could have a variety of causes. Eye or throat irritation was the most common symptom reported. None of those examined exhibited symptoms of over-exposure to chromium. All of the people tested had normal blood levels; more than half of the chromium blood tests were actually below the detection limit of the test. If a significant inhalation exposure to hexavalent chromium (the element of sodium dichromate that has been shown to be a lung carcinogen in studies of industrial workers exposed to high levels for more than two years) had occurred, elevated levels of chromium would have remained in the red blood cells for at least 120 days following exposure. Red-blood-cell testing of potentially exposed people occurred within 30 days of their last expected exposure and within 120 days of site encapsulation. Analysis of the blood testing for chromium was done at the Armed Forces Institute of Pathology in Washington, D.C. Whole blood testing was chosen because other medical tests (serum, urine) weren't sensitive enough to detect chromium exposures beyond 30 days. The recent disclosures of severe symptoms by Soldiers (i.e., coughing up blood, chrome holes, etc.) were not reported to the risk assessment team in October 2003. The extent of these concerns cannot be determined with any objective data at this point, though we are attempting to locate medical records of service members present at the site prior to the USACHPPM's arrival to determine if any specific medical conditions may have been linked to these Soldiers' service at the site.

The USACH PPM concluded that these medical results indicated that no significant exposure to sodium dichromate had occurred, and that the symptoms reported could be related to existing personal medical conditions and desert environment-related exposures, such as heat, sand, dust and wind. Based on the medical team's evaluation of medical and exposure assessment results, specific long-term follow-up surveillance of these people as a group was not recommended because the potential for long-term health effects caused by assignment to duty at the site was unlikely.

The Soldiers and DOD civilians located at the site were provided fact sheets about the potential exposures during the assessment and at a town hall meeting (open forum) with a question-and-answer session. Town halls were sponsored by unit leadership for all interested Soldiers and DOD civilians. The results of each person's medical exams, to include the whole blood test results were placed in the individual, hard-copy deployment medical records, along with a description of the potential exposure on a Standard Form 600 (Chronological Record of Medical Care Medical Record). The Army confirmed that the test results did in fact reach the Soldiers' hard-copy records. Potentially exposed Soldiers and DOD civilians were also instructed to direct healthcare providers to this information in their medical records and to raise any remaining concerns about this incident during their post-deployment health assessments. Medical follow-up for those Soldiers who have health concerns is available through the military medical system or the Department of Veterans Affairs, depending on the military status of the Soldier.

Based on the limited adverse health findings of the assessment, the survey team felt that there was limited benefit to conducting a medical evaluation on Soldiers that had relocated from the site prior to the arrival of the USACH PPM assessment team. The assessment team determined

that units from the 1st Battalion, 162nd Infantry from the Oregon Army National Guard and 133d Military Police Company of the South Carolina Army National Guard were present at the site prior to the team's arrival. Soldiers from these units were asked to complete an exposure and symptom survey, either directly through unit town hall meetings or through medical providers at their new locations if they had relocated to another area. For these past-exposed Soldiers, there were no unit records available to document who served at the site and for how long. The completed surveys, along with a fact sheet for medical providers, was to be placed in Soldier medical records by the unit as documentation of potential exposure to sodium dichromate and for reference in case of future health concerns.

Throughout the assessment, the USACHPPM team ensured that the operational commanders were kept apprised of the assessment findings and conclusions, to include daily situational reports to the CFLCC medical cell and briefings to the commanders of the four deployed and potentially exposed units/groups (1st Battalion, 152nd Infantry, of the Indiana Army National Guard; 133rd Military Police Company of the South Carolina Army National Guard; 1st Battalion of the 162nd Infantry of the Oregon Army National Guard; and Task Force Restore Iraq Oil of the U.S. Army Corps of Engineers). A formal Occupational and Environmental Health Survey and Risk Assessment report containing all of the results and recommendations was submitted to CFLCC on January 15, 2004. This report was initially classified in accordance with U.S. Central Command guidance; an unclassified report was published on January 10, 2009. At the time, DOD, Army, Joint Staff and U.S. Central Command Force Health Protection policy did not include a procedure for reporting deployment exposures or other operational public health information to non-deployed, rear area units such as the Indiana National Guard State Adjutant General or the U.S. Army Forces Command. This policy is being reevaluated at this time.

In addition to medical record information that is available to Department of Veterans Affairs (DVA) providers, the Deputy Assistant Secretary of Defense, Force Health Protection and Readiness has facilitated our collaboration with the DVA. In December 2008, DVA personnel reviewed a copy of the classified Occupational and Environmental Health Survey and Risk Assessment report. A copy of the declassified report was provided to the DVA in January 2009, and a presentation was made to the DOD/VA Deployment Health Working Group in May 2009.

The medical response to this incident was exemplary. The site was placed off-limits within a day of notification to the Combined Forces Land Component Command Surgeon. The USACHPPM deployed a team to theater within two weeks of request. The methodology and results of the USACHPPM assessment were reviewed, validated and cited as exemplary by the Defense Health Board, an independent review entity made up of medical and scientific professionals from academia and industry.

BURN PITS

As far back as Operation Joint Endeavor in Bosnia in 1996, military preventive medicine personnel recognized that while open burning of solid waste is sometimes an operational necessity during combat operations, it should be used to the minimum extent possible based on the operational situation. When open burning operations are necessary, they should be located as far downwind of personnel as possible.

In 2004, the USACHPPM deployed a response team to Camp Lemonier in Djibouti to assess the potential health risks from the burn pit smoke from an off-post burn pit located about 1.5 miles south of Camp Lemonier. At this location, the local population open-burned all of the solid waste from the surrounding area, to include the U.S. operations on Camp Lemonier. There was a solid waste incinerator present, but it was not in use at the time. The assessment consisted of advanced air sampling from volatile organic compounds, polyaromatic hydrocarbons, dioxins/furans and particulate matter less than 10 microns in diameter. The assessment concluded that the operational health risk estimate was moderate due to the elevated presence of acrolein and aluminum. Deployed preventive medicine teams have conducted several rounds of additional sampling at this location since. The operational health risk from acrolein was found to be low and was only detected above Military Exposure Guidelines sporadically.

In 2005, the burn pit operations at the Joint Base Balad were initially sampled by deployed preventive medicine teams. From their results, the USACHPPM concluded that additional sampling was needed to fully characterize the site. The USACHPPM and the U.S. Air Force School of Aerospace Medicine jointly performed both an operational health risk assessment and a long-term health risk assessment based on large-scale sampling events at Joint Base Balad in 2007. The sampling plan focused on burn pit emissions. Other potential and/or known sources of air emissions including airfield operations, diesel generators, ground vehicle operations, and naturally blowing sand and dust were also collected in the samples. The long-term health risk assessment was conducted using the U.S. Environmental Protection Agency (USEPA) standard health risk assessment methodology. The USEPA method is specifically designed to focus on people who may be the most sensitive to the effects of a particular exposure; therefore, it is considered to be very protective.

Using the USEPA method, the potential for short-term, reversible, irritant health effects to U.S. personnel was identified. Smoke from burning trash and other waste, especially in combination with hot, dry, dusty conditions, can cause temporary irritation of the eyes, nose and throat in some people, regardless of their health condition. However, no environmental monitoring data collected at Joint Base Balad to date have identified an increased risk for long-term health conditions. It is possible, however, that combinations of some exposures, such as smoke from burn pits, the high levels of airborne dust, and/or tobacco smoke in smokers, may increase the risk of chronic health

conditions in a small number of people, although we have no direct evidence of this at the present time. Due to anecdotal concerns raised about possible dioxin exposures at Joint Base Balad, the USACHPPM conducted a pilot study in cooperation with the Centers for Disease Control and Prevention, National Center for Environmental Health Laboratory (CDC-NCEH). Serum samples of Balad veterans from the DOD's Serum Repository were randomly selected for dioxin analysis at the CDC-NCEH. Both pre- and post- deployment samples were selected from the sera of personnel who had been deployed to Joint Base Balad at least twice for at least one year per deployment. The analyses did not find elevated levels of dioxin in the sera, as would be expected if personnel had been breathing elevated concentrations of dioxin during their deployments.

The USACHPPM and U.S. Air Force School of Aerospace Medicine have authored various risk communication products, including fact sheets and briefing slides, so that Service Members are aware of the results of sampling and health risk assessments as they are completed. The fact

sheets can be found on both the USACHPPM website and in Department of Defense Deployment Health and Family Readiness Library.

To improve on the lessons we've learned from this situation, we authored guidance on the use, operation and location of burn pits that was published in Headquarters, Department of the Army, Technical Bulletin, Medical 593, Guidelines for Field Waste Management, September 2006. This guidance is straightforward. The preferred method of solid waste disposal is incineration. Open burning should only be used in emergency situations until approved incinerators can be obtained. The potential use of improper burning methods can lead to significant occupational and environmental health exposures to deployed troops. We recommend that burn pit operations be conducted as far downwind as possible (at least 450 feet) from troop locations and living areas. Hazardous waste, batteries and medical waste should not be burned.

The USACHPPM and U.S. Air Force School of Aerospace Medicine briefed the Department of Defense/Department of Veterans Affairs Deployment Health Working Group in March 2009 on the burn pit health risk assessments at Joint Base Balad. The meeting focused on the air quality surveillance efforts at Joint Base Balad, Iraq, which included sampling for a range of toxic chemicals potentially produced by open burning of solid waste. We discussed the short- and long-term health effects expected based on the analyzed chemicals, data gaps, and possible future efforts to better characterize potential burn pit smoke exposures. We also addressed the DVA's questions arising from various misleading media accounts of burn pits and burn pit exposures. Since that time we have been consulting with the DVA on their inquiries into the extent of burn pit operations and the results of air sampling at other burn pit locations in the U.S. Central Command area of responsibility.

The USACH PPM, U.S. Air Force School of Aerospace Medicine, and the Navy and Marine Corps Public Health Center are jointly developing an air surveillance program for contingency operations, with a focus on locations with burn pits. The sampling plan will be coordinated with the Defense Health Board with the goal of identifying a field-expedient sampling strategy that is considered representative and defensible. The USACH PPM also is collaborating with the U.S. Army Engineer School Directorate of Environmental Integration to update Army deployment environmental management doctrine.

As a result of its assessments at Balad and Qarmat Ali, the USACHPPM continues to modify, update and expand deployment occupational and environmental health surveillance and preventive medicine activities from our experiences and lessons learned. Specific surveillance lessons learned from the Qarmat Ali Water Injection Facility and Joint Base Balad incidents include:

Producing, disseminating and archiving both classified and redacted deployment occupational and environmental health surveillance reports on both classified and unclassified networks.

Ensuring that our military and civilian personnel who deploy to active theaters of operation for deployment occupational and environmental health incidents are continually trained and up to date on personal deployment requirements.

Mr. Chairman and distinguished committee members, my thanks for inviting me to speak with you about the U.S. Army Center for Health Promotion & Preventive Medicine's role in environmental surveillance and health assessment of potential sodium dichromate exposures and open-pit burning in overseas contingency operations. Thank you for holding this hearing and for your enduring support of service members serving across the globe. I look forward to your questions.