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WASTE MANAGEMENT

DOD Needs to Fully Assess the Health Risks of Burn Pits

Statement for the Record by Cary Russell, Director,
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Accessible Version

GAO Highlights

Highlights of [GAO-18-596T](#), a statement for the record to the Subcommittee on Health, Committee on Veterans' Affairs, House of Representatives

Why GAO Did This Study

Burn pits help base commanders manage waste generated by U.S. forces overseas, but they also produce harmful emissions that military and other health professionals believe may result in chronic health effects for those exposed.

This statement provides information on the extent to which DOD has assessed any health risks of burn pit use.

This statement is based on a GAO report issued in September 2016 (GAO-16-781). The report was conducted in response to section 313 of the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015. Specifically, GAO assessed the methodology DOD used in conducting a review of the compliance of the military departments and combatant commands with DOD instructions governing the use of burn pits in contingency operations and the adequacy of a DOD report for the defense committees. GAO also obtained updates from DOD on actions taken to assess health risks from burn pits since September 2016.

What GAO Recommends

GAO made two recommendations focused on improving monitoring of burn pit emissions and examining any associated health effects related to burn pit exposure. DOD concurred with one recommendation and partially concurred with the other. GAO continues to believe the recommendations are valid.

View [GAO-18-596T](#). For more information, contact Cary Russell at (202) 512-5431 or russellc@gao.gov

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DOD Needs to Fully Assess the Health Risks of Burn Pits

What GAO Found

GAO reported in September 2016 that the effects from exposing individuals to burn pit emissions were not well understood, and the Department of Defense (DOD) had not fully assessed the health risks associated with the use of burn pits. Burn pits—shallow excavations or surface features with berms used to conduct open-air burning—were often chosen as a method of waste disposal during recent contingency operations in the U.S. Central Command (CENTCOM) area of responsibility, which extends from the Middle East to Central Asia and includes Iraq and Afghanistan. According to DOD Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program*, DOD should apply risk-management strategies to eliminate occupational injury or illness and loss of mission capability or resources. The instruction also requires all DOD components to establish procedures to ensure that risk-acceptance decisions were documented, archived, and reevaluated on a recurring basis. Furthermore, DOD Instruction 6055.05, *Occupational and Environmental Health (OEH)*, requires that hazards be identified and risk evaluated as early as possible, including the consideration of exposure patterns, duration, and rates.

While DOD has guidance that applies to burn pit emissions among other health hazards, DOD had not fully assessed the health risks of use of burn pits, according to DOD officials.

According to DOD officials, DOD's ability to assess these risks was limited by a lack of adequate information on (1) the levels of exposure to burn pit emissions and (2) the health impacts these exposures had on individuals. With respect to information on exposure levels, DOD had not collected data from emissions or monitored exposures from burn pits as required by its own guidance. Given the potential use of burn pits near installations and during future contingency operations, establishing processes to monitor burn pit emissions for unacceptable exposures would better position DOD and combatant commanders to collect data that could help assess exposure to risks.

GAO recommended that the Secretary of Defense (1) take steps to ensure CENTCOM and other geographic combatant commands, as appropriate, establish processes to consistently monitor burn pit emissions for unacceptable exposures; and (2) in coordination with the Secretary of Veterans Affairs, specifically examine the relationship between direct, individual, burn pit exposure and potential long-term health-related issues. DOD concurred with the first recommendation and partially concurred with the second. In a May 2018 status update regarding these recommendations, DOD outlined a series of steps it had implemented as well as steps that it intends to implement. The department believes these efforts will further enhance its ability to better monitor burn-pit emissions and examine the relationship between direct, individual, burn pit exposure and potential long-term health related issues. GAO believes the steps DOD is taking are appropriate.

Chairman Dunn, Ranking Member Brownley, and Members of the Subcommittee,

I am pleased to submit this statement on our September 2016 report covering the Department of Defense's use of burn pits.¹ Since the initiation of military operations in Afghanistan in 2001 and Iraq in 2003, the Department of Defense (DOD) has employed several methods to dispose of the waste that U.S. forces have generated in both countries. In general, the methods employed have been left to the discretion of base commanders and include the use of incinerators, landfills, and open-air burn pits on or near military bases. According to DOD officials, when making these decisions base commanders may take into consideration a number of factors, including the local security situation, the number of personnel on the installation, and the amount and type of waste generated by those personnel. As one of the options available, burn pits help base commanders manage waste, but they also produce smoke and harmful emissions that military and other health professionals believe may result in acute and chronic health effects for those exposed to the emissions.

My statement today focuses on the extent to which DOD has assessed any health risks of burn pit use. This statement is based on our September 2016 report. That work was conducted in response to section 313 of the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 (NDAA for Fiscal Year 2015).² Specifically, we assessed the methodology DOD used in conducting a review of the compliance of the military departments and combatant commands with DOD Instruction 4715.19, *Use of Open-Air Burn Pits in Contingency Operations*,³ and the adequacy of the subsequent report DOD sent to the defense committees containing the results of its review.⁴

¹GAO, *Waste Management: DOD Has Generally Addressed Legislative Requirements on the Use of Burn Pits but Needs to Fully Assess Health Effects*, [GAO-16-781](#) (Washington, D.C.: Sept. 26, 2016).

²Pub. L. No. 113-291, § 313 (2014).

³DOD Instruction 4715.19, *Use of Open-Air Burn Pits in Contingency Operations* (Feb. 15, 2011) (incorporating change 3, July 3, 2014). The instruction was updated on Oct. 6, 2017.

⁴Department of Defense, *Report on Prohibition of the Disposal of Covered Waste in Open-Air Burn Pits* (March 2016).

To evaluate the extent to which DOD has assessed any health effects of burn pit use, we reviewed relevant health assessments on the effects of burn pits, including a 2011 report by the Institute of Medicine that was contracted by the Department of Veterans Affairs, as well as prior related reports by GAO and the Special Inspector General for Afghanistan Reconstruction. We also interviewed officials from U.S. Central Command (CENTCOM), U.S. Army Central Command, U.S. Air Force Central Command, Department of Veterans Affairs, and Institute of Medicine to discuss any effects of exposures to burn pit emissions, among other things. Additionally, we obtained an update from DOD in May 2018 on actions taken regarding our findings and recommendations from our September 2016 report.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Burn pits—shallow excavations or surface features with berms used to conduct open-air burning—were often chosen as a method of waste disposal during recent contingency operations in the CENTCOM area of responsibility, which extends from the Middle East to Central Asia and includes Iraq and Afghanistan. In 2010, we reported that there were 251 active burn pits in Afghanistan and 22 in Iraq.⁵ However, in 2016, we reported that the use of burn pits in the CENTCOM area of responsibility had declined since that time. As of June 2016, DOD officials told us that there were no military-operated burn pits in Afghanistan and only one in Iraq. According to DOD officials, the decline in the number of burn pits from 2010 to 2016 could be attributed to such factors as (1) using contractors for waste disposal and (2) increased use of waste management alternatives such as landfills and incinerators. However, DOD officials acknowledged that burn pits were being used to dispose of waste in other locations that are not military-operated. Specifically, these

⁵GAO, *Afghanistan and Iraq: DOD Should Improve Adherence to Its Guidance to Open Pit Burning and Solid Waste Management*, [GAO-11-63](#) (Washington, D.C.: Oct. 15, 2010).

officials noted instances in which local contractors had been contracted to haul away waste and subsequently disposed of the waste in a burn pit located in close proximity to the installation. In such instances, officials stated that they requested that the contractors relocate the burn pit. According to a DOD official, as of May 2018 there are two active burn pits in the CENTCOM area of responsibility.

Although burn pits help base commanders to manage waste, they also produce smoke and emissions that military and other health professionals believe may result in acute and chronic health effects for those exposed. We previously reported that some veterans returning from the Iraq and Afghanistan conflicts have reported pulmonary and respiratory ailments, among other health concerns, that they attributed to burn pit emissions.⁶ Numerous veterans have also filed lawsuits against a DOD contractor alleging that the contractor mismanaged burn pit operations at several installations in both Iraq and Afghanistan, resulting in exposure to harmful smoke that caused these adverse health effects. We also previously reported on the difficulty of establishing a correlation between occupational and environmental exposures and health issues.⁷ For example, in 2012 we reported that establishing causation between an exposure and an adverse health condition can be difficult for several reasons, including that for many environmental exposures, there is a latency period—the time period between initial exposure to a contaminant and the date on which an adverse health condition is diagnosed.⁸ When there is a long latency period between an environmental exposure and an adverse health condition, choosing between multiple causes of exposure may be difficult. In addition, in 2015 we reported that the Army had recently published a study that evaluated associations between deployment to Iraq and Kuwait and the development of respiratory conditions post-deployment.⁹ However, the study was unable to identify a causal link between exposures to burn pits and respiratory conditions.

⁶[GAO-11-63](#).

⁷GAO, *Defense Health Care: DOD Needs to Clarify Policies Related to Occupational and Environmental Health Surveillance and Monitor Risk Mitigation Activities*, [GAO-15-487](#) (Washington, D.C.: May 22, 2015).

⁸GAO, *Defense Infrastructure: DOD Can Improve Its Response to Environmental Exposures on Military Installations*, [GAO-12-412](#) (Washington, D.C.: May 1, 2012).

⁹[GAO-15-487](#) and Abraham et al., “A Retrospective Cohort Study of Military Deployment and Postdeployment Medical Encounters for Respiratory Conditions,” *Military Medicine*, vol. 179 (2014): 540-546.

DOD Had Not Fully Assessed the Health Risks of Burn Pits

In our 2016 report, we found that the effects from exposing individuals to burn pit emissions were not well understood, and DOD had not fully assessed these health risks. Under DOD Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program*, it is DOD policy to apply risk-management strategies to eliminate occupational injury or illness and loss of mission capability or resources. DOD Instruction 6055.01 also instructs all DOD components to establish procedures to ensure that risk-acceptance decisions were documented, archived, and reevaluated on a recurring basis.¹⁰ Furthermore, DOD Instruction 6055.05, *Occupational and Environmental Health (OEH)*, requires that hazards be identified and risk evaluated as early as possible, including the consideration of exposure patterns, duration, and rates.¹¹ Notwithstanding this guidance, which applies to burn pit emissions among other health hazards, DOD had not fully assessed the health risks of use of burn pits according to DOD officials.

According to DOD officials, DOD's ability to assess these risks was limited by a lack of adequate information on (1) the levels of exposure to burn pit emissions and (2) the health impacts these exposures had on individuals. With respect to information on exposure levels, DOD had not collected data from emissions or monitored exposures from burn pits as required by its own guidance. DOD Instruction 4715.19 requires that plans for the use of open-air burn pits include ensuring the area was monitored by qualified force health protection personnel for unacceptable exposures, and CENTCOM Regulation 200-2, *CENTCOM Contingency Environmental Standards*, requires steps to be taken to sample or monitor burn pit emissions.¹² However, DOD officials stated that there were no processes in place to specifically monitor burn pit emissions for the purposes of correlating potential exposures. They attributed this to a lack of singular exposure to the burn pit emissions, or emissions from any

¹⁰DOD Instruction 6055.01, *DOD Safety and Occupational Health (SOH) Program* (Oct. 14, 2014).

¹¹DOD Instruction 6055.05, *Occupational and Environmental Health (OEH)* (Nov. 11, 2008). This instruction was updated on November 21, 2017.

¹²CENTCOM Regulation 200-2, *CENTCOM Contingency Environmental Standards* (Sept. 15, 2014).

other individual item; instead, monitoring was done for the totality of air pollutants from all sources at the point of population exposure. As we reported in September 2016, given the potential use of burn pits near installations and their potential use in future contingency operations, establishing processes to monitor burn pit emissions for unacceptable exposures would better position DOD and combatant commanders to collect data that could help assess exposure to risks.

In the absence of the collection of data to examine the effects of burn pit exposure on servicemembers, the Department of Veterans Affairs in 2014 created the airborne hazards and open-air burn pit registry,¹³ which allows eligible individuals to self-report exposures to airborne hazards (such as smoke from burn pits, oil-well fires, or pollution during deployment), as well as other exposures and health concerns.¹⁴ The registry helps to monitor health conditions affecting veterans and servicemembers, and to collect data that would assist in improving programs to help those with deployment exposure concerns.

With respect to the information on the health effects from exposure to burn pit emissions, DOD officials stated that there were short-term effects from being exposed to toxins from the burning of waste, such as eye irritation and burning, coughing and throat irritation, breathing difficulties, and skin itching and rashes. However, the officials also stated that DOD did not have enough data to confirm whether direct exposure to burn pits caused long-term health issues. Although DOD and the Department of Veterans Affairs had commissioned studies to enhance their understanding of airborne hazards, including burn pit emissions, the then-current lack of data on emissions specific to burn pits limited DOD's ability to fully assess potential health impacts on servicemembers and other base personnel, such as contractors.

For example, in a 2011 study that was contracted by the Department of Veterans Affairs, the Institute of Medicine stated that it was unable to determine whether long-term health effects are likely to result from burn

¹³This registry was created in response to the Dignified Burial and Other Veterans' Benefits Improvement Act of 2012, Pub. L. No. 112-260, § 201 (2013).

¹⁴Eligible individuals include servicemembers or veterans who served in Iraq, Afghanistan, or Djibouti on or after September 11, 2001, or the Southwest Asia theater of operations on or after August 2, 1990 (e.g., the Persian Gulf War).

pit exposure due to inadequate evidence of an association.¹⁵ While the study did not determine a linkage to long-term health effects, because of the lack of data, it did not discredit the relationship either. Rather, it outlined a methodology of how to collect the necessary data to determine the effects of the exposure. Specifically, the 2011 study outlined the feasibility and design issues for an epidemiologic study—that is, a study of the distribution and determinants of diseases and injuries in human populations—of veterans exposed to burn pit emissions. Further, the 2011 study reported that there were a variety of methods for collecting exposure information, but the most desirable was to measure exposures quantitatively at the individual level. Individual exposure measurements could be obtained through personal monitoring data or biomonitoring.¹⁶ However, if individual monitoring data were not available, and they rarely are, individual exposure data might also be estimated from modeling of exposures, self-reported surveys, interviews, job exposure matrixes, and environmental monitoring. Further, to determine the incidence of chronic disease, the study stated that servicemembers must be tracked from their time of deployment, over many years.

While the Institute of Medicine outlined a methodology of how to conduct an epidemiologic study, DOD had not taken steps to conduct this type of research study, specifically one that focused on the direct, individual exposure to burn pit emissions and the possible long-term health effects of such exposure. Instead, some officials commented that there were no long-term health effects linked to the exposures of burn pits because the 2011 study did not acknowledge any. Conversely, Veterans Affairs officials stated that a study aimed at establishing health effect linkages could be enabled by the data in its airborne hazards and open-air burn pit registry, which collects self-reported information on servicemembers' deployment location and exposure.

¹⁵Institute of Medicine for the Department of Veterans Affairs, *Long-Term Health Consequences of Exposure to Burn Pits in Iraq and Afghanistan* (Washington, D.C.: The National Academies Press, 2011).

¹⁶Biomonitoring assesses an individual's exposure to environmental agents by measuring the concentrations of the agents in biological samples, usually blood or urine but possibly adipose tissue, hair, or nails. The biomarker can be the external substance itself (for example, lead) or a metabolite of the external substance processed by the body (for example, cotinine, a metabolite of nicotine) and it indicates the absorbed dose or allows an estimate of the target-tissue dose for the time of exposure.

In response to a mandate contained in section 201 of Public Law 112-260, the Department of Veterans Affairs entered into an agreement with the National Academies of Sciences, Engineering, and Medicine to convene a committee to provide recommendations on collecting, maintaining, and monitoring information through the registry. The committee assessed the effectiveness of the Department of Veterans Affairs' information gathering efforts and provided recommendations for addressing the future medical needs of the affected groups. The study was conducted in two phases. Phase 1 was a review of the data collection methods and outcomes, as well as an analysis of the self-reported veteran experience data gathered in the registry. Phase 2 was focused on the assessment of the effectiveness of the actions taken by the Department of Veterans Affairs and DOD and provided recommendations for improving the methods enacted. The committee released its final report in February 2017.¹⁷ As we reported in September 2016, considering the results of this review as well as the methodology of the 2011 Institute of Medicine study as part of an examination of the relationship between direct, individual exposure to burn pit emissions and long-term health effects could better position DOD to fully assess those health risks.

In our September 2016 report we recommended that the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology, and Logistics¹⁸ to:

- take steps to ensure CENTCOM and other geographic combatant commands, as appropriate, establish processes to consistently monitor burn pit emissions for unacceptable exposures; and
- in coordination with the Secretary of Veterans Affairs, specifically examine the relationship between direct, individual, burn pit exposure and potential long-term health-related issues. As part of that

¹⁷Since the committee's report was released after the release of our September 2016 report we did not evaluate it. See National Academies of Sciences, Engineering and Medicine, *Assessment of the Department of Veterans Affairs Airborne Hazards and Open Burn Pit Registry* (Washington, D.C.: The National Academies Press, 2017).

¹⁸Effective February 1, 2018, the National Defense Authorization Act for Fiscal Year 2017 provided for the restructuring of the Under Secretary of Defense for Acquisition, Technology, and Logistics. Pub. L. No. 114-328, § 901 (2016) (codified at 10 U.S.C. §§ 133a and 133b). The position has been divided into the Under Secretary of Defense for Research and Engineering and the Under Secretary of Defense for Acquisition and Sustainment.

examination, consider the results of the National Academies of Sciences, Engineering, and Medicine's report on the Department of Veteran Affairs registry and the methodology outlined in the 2011 Institute of Medicine study that suggests the need to evaluate the health status of service members from their time of deployment over many years to determine their incidence of chronic disease, with particular attention to the collection of data at the individual level, including the means by which that data is obtained.

DOD concurred with the first recommendation, stating that the department will ensure that geographic combatant commands establish and employ processes to consistently monitor burn pit emissions for unacceptable exposures at the point of exposure and if necessary at individual sources. In a May 2018 status update regarding this recommendation, DOD stated that it will be updating applicable department policy and procedures, its tactics techniques and procedures manual, and guidance for sampling and analysis plans to improve monitoring of burn pit emissions and other airborne hazard emissions. Specifically, DOD stated it will update DOD Instruction 6490.03, *Deployment Health*; that the update will provide revised procedures on deployment health activities required before, during, and after deployments, including Occupational and Environmental Health Site Assessments; and that it estimates this will be completed by the 4th quarter of fiscal year 2018. In addition, the department stated it will update its Occupational and Environmental Health Site Assessments tactics, techniques, and procedures manual and update guidance for sampling and analysis plans and that the updates will provide revised tactics, techniques, and procedures that will improve the quality of health risk assessment. The department expects this to be completed by the 1st quarter of fiscal year 2019. GAO believes that upon completion of these actions, DOD will have met the intent of this recommendation.

With respect to our recommendation to sponsor research, in coordination with the Secretary of Veterans Affairs, to specifically examine the relationship between burn pit exposure and potential health-related issues, DOD partially concurred, stating that a considerable volume of research studies had already been completed, were ongoing, or were planned in collaboration with the Department of Veterans Affairs and other research entities to improve the understanding of burn pit and other ambient exposures to potential long-term health outcomes and that the studies, where applicable, consider and incorporate the methodology outlined in the 2011 Institute of Medicine study. In a May 2018 status update regarding this recommendation, the department stated that DOD

and the Department of Veterans Affairs continue to collaborate with each other and other entities on research activities that address burn pit and other airborne exposures, and potential long-term health outcomes. Specifically, the department cited a DOD/Veterans Affairs Airborne Hazards Symposium held in May 2017; an update to the Veterans Affairs/DOD Deployment Health Working Group "Airborne Hazards Joint Action Plan" to be completed by the 3rd quarter of fiscal year 2018; and the completion of research to examine airborne hazard exposures and potential health-related issues. GAO believes that to the extent that continued studies consider and incorporate the methodology outlined the 2011 Institute of Medicine study, where appropriate, DOD will have met the intent of this recommendation.

Chairman Dunn, Ranking Member Brownley, and Members of the Subcommittee, this concludes my statement for the record.

GAO Contact and Staff Acknowledgments

If you or your staff have any questions about this statement, please contact Cary Russell, Director, Defense Capabilities and Management, at 202-512-5431 or russellc@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this statement include Guy LoFaro (Assistant Director), Lorraine Ettaro, Shahrzad Nikoo, Jennifer Spence, and Matthew Young.

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