

GULF WAR RISK FACTOR REPORT REPRINTS

Oil Well Fire Smoke and Petroleum

The following article originally appeared in the August 2001 issue of the Gulf War Review newsletter. For information about the newsletter, contact Mr. Donald J. Rosenblum, Deputy Director, Environmental Agents Service (131), VA Central Office, 810 Vermont Avenue, NW, Washington, DC 20420, telephone: 202-273-8580.

Early Worries about Health Problems from Oil Well Fires Not Seen in Gulf War Veterans

The following is part of a series of articles about various environmental hazards or risks encountered by military personnel deployed to the Gulf War theater of operations. Previous articles have focused on chemical and biological warfare agents, pesticides, depleted uranium, pyridostigmine bromide, infectious diseases, and vaccinations, including anthrax and botulinum. They can be found on-line at www.va.gov/health/envIRON/persgulf.htm.

Perhaps one of the most vivid and alarming images of the Gulf War is that of the hundreds of burning oil wells. Viewing the fires with the large volume of billowing smoke, many people in the U.S. braced for the worse – large numbers of Gulf War participants with serious breathing and other respiratory problems. In December 1991, Congress responded to this concern by including in Public Law 102-190 a provision (Section 734) that required the Secretary of Defense to “establish and maintain a special record relating to members of the Armed Forces who ...were exposed to the fumes of the burning oil in the Operation Desert Storm theater of operations during the Persian conflict.” (VA was developing its Gulf War Registry at the same time.)

Less than a year later in November 1992, in Public Law 102-585, Congress recognized that other potential hazards and environmental factors might have caused the medical problems of some Gulf War participants. Section 704 of that law directed the Department of Defense (DoD) Persian Gulf Registry to expand the DoD Registry to include “Any other member who served in the Operation Desert Storm theater of operations during the Persian Gulf conflict.”

During the past decade, a number of internal government and external committees/boards have looked at the potential health risks of exposure to smoke from oil well fires. None of them found that exposure to be the likely cause of the problems that some Gulf War veterans are experiencing. Dr. Mark A. Brown, Director, VA’s Environmental Agents Service noted, “Even before the war ended VA was worried that returning Gulf War veterans would have health problems from the oil well fires smoke. We now know that this environmental exposure wasn’t really a significant problem, and attention has shifted to other deployment related health issues.”

Background

In February 1991, the first oil well fires were ignited by the Iraqi armed forces during a retreat in the Persian Gulf War. Between February 1991 to November 1991, 605 oil well fires were started. Oil well fires produced dense clouds of soot, liquid, aerosols, and gases. Unknown numbers of troops were likely exposed to high concentration of particulate matter, metals, sulfur, and nitrogen oxides in the air as a result of oil well fires—many of the same components found in smog.

A concentrated effort was made by the DoD, U.S. Environmental Protection Agency, the U.S. Department of Health and Human Services, and the National Oceanic and Atmospheric Administration to evaluate the health effects from these fires. Based on data collected from May through December 1991, the carcinogenic and non-carcinogenic health risks from exposure to oil well fire smoke were determined to be minimal due to the lofting of the smoke above the ground level and the nearly complete combustion of most chemical substances.

The plumes of the billowing smoke occasionally remained low to the ground, in some areas enveloping U.S. military personnel. Exposures to respiratory irritants, carcinogens and neurotoxic compounds were highest during wintertime encampments in Saudi Arabia.

In December 1999, the Final Report of the Presidential Advisory Committee (PAC) on Gulf War Illnesses indicated that known immediate health effects from inhaling large amounts of smoke and particulates are primarily respiratory. Toxic gases were not detected at high levels during the fire. High levels of airborne particulates are associated with increased rates of asthma and can worsen other chronic respiratory conditions. With chronic exposure (months or years) to particulates, there is increased risk of some loss in lung function or chronic bronchitis, especially in cigarette smokers.

Exposures to organic compounds were found to be similar to the levels observed in Houston and Philadelphia, cities with major petrochemical industries. Although substantial increases were noted in particulates, concentrations were still considered normal for the Middle East. Air pollutants expected from the oil fires were classified into four categories:

- Reactants: uncombusted crude oil components
- Combustion products: carbon dioxide and water
- Incomplete Combustion Products: carbon monoxide
- Products of Secondary Reactions: photolysis (chemical decomposition by the action of sun light)

Sampling was designed by the U.S. Army Environmental Hygiene Agency so that results could be used to estimate risks of cancer and subchronic non-cancer diseases. The total cancer risk is determined by adding the individual cancer risks for each pollutant in each means of exposure (i.e. breathing, eating, and through the skin), then adding the risk

for all the pathways. Further, on the basis of air and soil pathway analysis, the excess cancer risk resulting from exposure to oil fire smoke both in Kuwait and Saudi Arabia, did not surpass two excess cancers per one million. A soon to be published VA mortality study reports that the risk of death from natural causes, including cancer, is the same among Gulf War veterans compared to non-Gulf veterans.

Health Risks Small

There has also been no indication of unexplained illnesses among U.S. civilian firefighters worked to put out the oil well fires after the cease-fire, and who were highly exposed to combusted and non-combusted products of damaged oil wells. The professional firefighters were presumably exposed to a much higher level of pollutants from the burning oil wells than the average U.S. service member.

DoD's Geographic Information System (GIS) was used for data integration and risk calculation. The GIS allows for data from the environmental sampling, modeled pollutant concentrations, satellite imagery, exposure factors, chemical toxicity, and the troop unit location databases to be combined and assessed in determining the oil fire exposure and health risks to U.S. service members. This information together with various independent review committees all indicate that the exposures that troop units received from oil fires and other industrial sources in the Gulf are unlikely, by themselves, to have caused long-term health problems.

In considering in how to evaluate health impacts of hazardous wartime experience in the future, the Final Report of the PAC made the following research recommendations:

- Develop more accurate and reliable troop locator systems;
- Monitor Gulf War veterans for increased rates of cancer through long-term mortality studies;
- The Research Working Group should consult more thoroughly with other federal agencies. Members of the Research Working Group include scientists and managers from VA, DoD and HHS. The Research Working Group serves as a common forum for researchers to present ideas and findings and collectively respond to emerging research issues and problems.

Readers with internet access may wish to get additional information about this subject and related topics at <http://www.gulflink.osd.mil/>

Martha Adell Cruz, a full-time communications/journalism student at the Austin Community College in Austin, Texas, was the principal author of the above article. Adell wrote this article in June 2001 while she was serving as a Summer Intern, through the Hispanic Association of Colleges and Universities (HACU), in VA's Environmental Agents Service. She plans to graduate in Spring 2002 and looks forward to a career in journalism.

