DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Washington DC 20201

TESTIMONY BY

JOHN S. ANDREWS, Jr., M.D., M.P.H.

PUBLIC HEALTH SERVICE

U. S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

BEFORE THE

SUBCOMMITTEE ON HOSPITALS AND HEALTH CARE

COMMITTEE ON VETERANS' AFFAIRS

SEPTEMBER 16, 1992

Good morning, Mr. Chairman. I am Dr. John Andrews, Associate Administrator for Science for the Agency for Toxic Substances and Disease Registry within the Public Health Service. I am accompanied by Dr. Henry Falk, Director of the Division of Environmental Hazard and Health Effects of the National Center for Environmental Health of the U.S. Centers for Disease Control (CDC), and Dr. Paul Seligman, Chief of the Medical Surveillance Section within the National Institute for Occupational Safety and Health, also of CDC.

Thank you for the opportunity to appear here today and provide information on the Department of Health and Human Service's activities regarding potential adverse health effects related to service in the Persian Gulf. Dr. Ruth Etzel, who has carried out human health studies in Kuwait, is currently out of the country. Dr. Falk, who is her supervisor, is also knowledgeable of the volatile organic chemical testing carried out by the Centers for Disease Control laboratory. Dr. Seligman went to Saudi Arabia and Kuwait in March 1991 as a member of the U.S. Interagency Air Assessment Team, led by the Environmental Protection Agency. He is informed regarding the air and health conditions in March of 1991. I was in Saudi Arabia and Kuwait in February and March 1991, assigned by the Public Health Service (PHS) to the U.S. Army's 352 Civil Affairs Command. I worked with Government of Kuwait personnel to reestablish public health services in Kuwait. All three of us have been involved as PHS medical officers in advising the U.S. military on potential health problems related

to exposure to the smoke of more than 600 oil well fires. We are all proud of the gallant record of achievement of our troops in the Gulf.

Dr. Frank Young, Deputy Assistant Secretary for Health/Science and Environment, has coordinated the Public Health Service follow-up activities related to the Persian Gulf. He regrets that he could not be here today to represent the Public Health Service. He is on detail in South Florida to assist in responding to the public health impact of Hurricane Andrew. I am on detail to his office.

In February 1991, more than 600 oil wells were set on fire throughout Kuwait. During the next 8 months an estimated 9,000 workers from 43 different countries battled the burning oil wells in Kuwait. All the wells were capped by early November 1991.

During Operation Desert Shield, Public Health Service Captain Joseph Garcia, Chief, Federal Programs Branch, National Health Service Corps, was assigned to work with the U.S. Army and government of Kuwaiti personnel in planning for the public health needs in Kuwait after liberation. Subsequently, I was detailed to continue the planning effort and accompany the U.S. troops into Kuwait. In response to concerns about the health impacts of the burning oil fields in Kuwait, the PHS sent Dr. Seligman with the U.S. Interagency Air Assessment Team. By late March, PHS had

issued a preliminary health assessment and had made plans to send Dr. Etzel to the Gulf to investigate the acute respiratory hazards associated with exposure to the oil well fire smoke.

While in Kuwait, Dr. Etzel also assisted officials from the Government of Kuwait to design and undertake monitoring and research projects to assess possible short and long term health effects of the air pollution created by the burning oil fields. One of the most important contributions was the initiation of a health alert system. This system enabled public health authorities, physicians, and the public to know if the air quality was deteriorating so citizens could be warned to stay indoors, to refrain from outdoor physical activity, and to seek medical attention early if symptoms arose. The initiation of emergency room surveillance at two local hospitals and five clinics, the design of a follow-up study of residents of Kuwait who have asthma, and the design of a long term study of persons who were heavily exposed to the oil fire plume were also initiated.

In addition, PHS set up an Ad Hoc Committee, the Kuwait Working Party, composed of representatives from 22 Federal agencies. As Dr. Young testified on October 16, 1991, before the Senate Committee on Environment and Public Works, the Kuwait Working Party (KWP) was charged to identify public health issues, strategies, and approaches related to the oil spills and oil

fires through the formation of a scope of action document. Six priority public health issues were identified:

1. Are there acute and chronic health hazards from the spilled oil and plumes from the oil well fires in Kuwait?

2. Who is exposed to the spilled oil and plumes from the oil well fires?

3. What is the nature and extent of the exposure?

4. What public health infrastructure should be developed so that acute and chronic adverse health effects associated with exposure to the spilled oil or the oil well fires can be identified?

5. What risk management and disease prevention policies need to be set up for persons exposed (already or in the future) to the spilled oil and plumes from the oil well fires?

6. What new knowledge about the adverse health effects associated with exposure to the spilled oil and plumes from the oil well fires needs to be obtained?

Following a review of air monitoring activities from April through July 1991, the PHS issued a revised Health Advisory for Kuwait and Saudi Arabia on October 9, 1991. The health advisory provided the following information: two major pollutants, sulfur dioxide and nitrogen dioxide, never reached harmful levels; levels of carbon monoxide exceeded the U.S. alert level on rare occasions, possibly due to increased vehicular traffic; levels of particulate matter on a number of occasions exceeded U.S. alert levels, but this occurs regularly in Kuwait even in the absence of oil well fires due to sand and dust storms; and measurements of air pollutants from the Kuwait oil fires were still not complete or adequate to fully evaluate the potential long-term health effects.

The advisory for Kuwait and Saudi Arabia recommended precautions for populations at risk, including asthmatics, individuals with chronic respiratory conditions, children, the elderly, and pregnant women. These recommendations were similar to those given in U.S. cities on days when air pollution levels are high; people at risk were encouraged to stay indoors, refrain from outdoor physical activity, and seek medical attention early if symptoms arose.

As a result of data gathered in these visits and subsequent analysis we have begun to answer the questions posed by the Kuwait Working Party. We've compiled information specific to

three distinct populations -- U. S. military personnel, Kuwaiti civilians, and fire fighters.

U.S. Military Personnel

A medical evaluation conducted by Dr. Seligman in March 1991 included a review of U.S. military infirmary records at three medical sites serving approximately 2500 service personnel maintained by the 209th Medical Company (Clearing), U.S. Army; a review of civilian outpatient medical and pharmacy records; interviews with Kuwaiti soldiers present in the oil fields; interviews with physicians attending patients in a large hospital in Kuwait City; and an interview with the head of the Kuwaiti Allergy Center that treats and cares for asthma cases. Dr. Seligman also met with the medical officer at the U.S. Embassy in Kuwait, the Kuwait Minister of Public Health, and the Head of the Kuwaiti Environmental Protection Agency to assess the priorities and resources available to begin air monitoring in the region. In Saudi Arabia, Dr. Seligman met with physicians to determine the capabilities of the Saudi public health system to conduct medical surveillance.

Review of U.S. infirmary records during the period beginning March 7 and ending March 17, 1991, showed that, of 357 infirmary visits, 14 (approximately 4 percent) were for upper respiratory complaints, mostly upper respiratory infections or cough. Of

this number, three soldiers were treated for asthma, all of whom had a previous medical history of asthma; one had been on medications to control asthma.

In addition, in March 1991, the Navy's Preventive Medicine Augmentation Team requested assistance from Dr. Seligman in the design of a questionnaire survey to be administered to over 2700 Marines in Kuwait and Saudi Arabia. The purpose of the questionnaire was to determine the health status of Marines during the Desert Storm operation, and to compare symptoms reported among Marines in Kuwait who were in close proximity to the oil fires with Marines in Saudi Arabia who were at a greater distance from them. Survey results, currently being analyzed by the Department of Defense, indicate that Marines in Kuwait reported more frequent symptoms of upper respiratory irritation compared with those who served only in Saudi Arabia. Marines with a history of asthma were more likely to report wheezing in Kuwait than those in Saudi Arabia.

At the request of the U.S. Army, the CDC laboratory also analyzed blood samples collected at three different times from a small number of the same soldiers: while in Germany before leaving for Kuwait, after two months in Kuwait, and after leaving Kuwait and returning to Germany. Compared to measurements of volatile organic compounds in U.S. residents, the levels of these same compounds were not elevated among these soldiers. The one

exception was tetrachloroethylene, which was elevated; exposure to this chemical most likely resulted from use of a degreaser by the soldiers.

In August 1992 Dr. Etzel participated in a working group of experts to review concerns over health effects associated with low dose exposures to petroleum products. This working group was convened by the U. S. Army on August 20, 1992. At that time, the working group reviewed recent reports of illness in veterans, discussed the appropriate clinical work up for patients being evaluated for concerns of petroleum toxicity, and discussed other possible causes for various reported symptoms. A consensus statement from that meeting is being developed by the Army.

A related health issue is leishmaniasis in persons returning from Operation Desert Storm. The Walter Reed Army Medical Center (WRAMC) reported several cases of viscerotropic leishmaniasis, a rare and potentially fatal parasitic infection of internal organs, in personnel returning from Operation Desert Storm.

CDC contributed in the effort to detect cases of viscerotropic leishmaniasis by publishing a public health alert in the February 28, 1992 Morbidity and Mortality Weekly Report. This alert summarized who should be evaluated for possible infection and where such evaluation could be obtained. The alert also described the availability at CDC of sodium stibogluconate, the

drug recommended to treat leishmaniasis. CDC forwarded to state and local health departments policy statements drafted by major blood banking associations regarding their donor exclusion policies for persons who had traveled to affected areas of the Middle East.

As of September 3, 1992, CDC had confirmed one infection among 518 persons tested.

Kuwaiti Citizens

April 1991 air monitoring data from the Kuwait Environmental Protection Department demonstrated that the quality of air in Kuwait City compares favorably to many American cities. In other words, the pollutants have not been elevated to levels that would be associated with acute adverse health effects.

Acute symptoms experienced by persons in March 1991, when 600 of the wells were on fire, included mildly burning eyes, sore throats, increased nasal discharge, occasional coughing, and a feeling of particles dropping on the skin.

Data analysis of emergency room admissions at two hospitals in Kuwait City showed an increase in the proportion of visits for gastrointestinal illnesses, heart disease, psychiatric illnesses, chronic bronchitis, emphysema, and bronchiectasis during the

period after the oil well fires. However, there was no increase in the proportion of visits for such expected conditions as acute upper and lower respiratory infections or asthma in the period when the oil fires were burning.

Review of civilian records by Dr. Seligman and associates in March 1991 indicated that, of 182 civilian outpatient visits, 9 (approximately 5 percent) were for respiratory complaints. Three civilians had potentially pollution-related respiratory complaints: a 7-year old with asthma, a 20-year old with "difficulty breathing," and a 50-year old with chest pressure admitted for a possible myocardial infarction.

Kuwaiti soldiers and physicians who had treated civilian patients reported symptoms that included dry cough, black-tinged sputum, sore throats, increased nasal discharge, mildly burning eyes, a sensation that particles were falling on the skin, and fear that the exposure to the polluted air would result in adverse health effects. However, no reports of respiratory complaints requiring medical treatment among previously healthy individuals were observed. No deaths attributable to the air pollution were reported during the field investigation, although the disruption in Kuwait precluded a complete ascertainment of mortality.

Fire Fighters

During a second visit to Kuwait in October 1991, Dr. Etzel conducted a cross-sectional study of exposure to 33 volatile organic compounds among American fire fighters. Dr. Etzel visited an area where fire fighters gathered for meals at the end of the day, and recruited volunteers for this study. Samples of blood from 40 fire fighters, typically within two hours after they left the oil fields, were collected and analyzed by the CDC laboratory. Compared to a sample of 114 U.S. residents, these fire fighters had higher blood concentrations of ethylbenzene, benzene, xylene, styrene and toluene, 1,1,1-trichloroethane, 1,2-dichloropropane, and tetrachloroethylene. However, due to the short half-life of these chemicals in the blood, tests carried out at one point in time cannot be used to predict long-term health effects.

Summary of Current Findings

The hazards to the soldiers posed by the smoke were largely dependent on the concentration of the pollutants in the air near the camps. Fortunately, the plume from the fires rose up to 10,000 to 12,000 feet, mixing with the air and then dispersed for several thousand miles downwind over a period of several weeks. As the plume travelled, the particles and gases contained within it became more widely dispersed and also more diluted. The

highest concentrations were in the areas nearest the affected oil fields and the areas immediately downwind. Few soldiers were in these areas for long periods of time. Considerable dilution took place over space, such that by the time the plume reached Saudi Arabia, where most of the troops were stationed, it was far less visible and less concentrated than in Kuwait.

Nevertheless, some minor respiratory problems were present among the soldiers. As mentioned previously, a survey of Marines stationed in Saudi Arabia and Kuwait showed that Marines in Kuwait reported more frequent symptoms of upper respiratory irritation such as dry cough compared with those who served only in Saudi Arabia. Marines with a history of asthma were more likely to report wheezing in Kuwait compared with Marines in Saudi Arabia.

During, and after Operation Desert Storm, various models were used to predict morbidity (illness), mortality (deaths), and cancer risks due to exposure to the oil well fire smoke. The predictions of these models differed greatly. The predictions of one of these models changed dramatically after real, rather than estimated, information became available. I will contrast the predicted illnesses, deaths, and cancer rates from this model used in the spring of 1991, with the predictions from the same model after a large number of measurements had been taken. In the spring of 1991, the model predicted 27,839 illnesses, 1,883

deaths, and 10,273 cancers per 100,000 population for Al Ahmadi, a populated area near the oil well fires. In October 1991, after actual measurements were used in the model, it predicted only 17 illnesses, 4 deaths, and 0.3 cancers per 100,000 population for Al Ahmadi. The second scenario fits more closely with what PHS physicians and Kuwaiti governmental personnel have reported. It is important that models be validated continually so that the health professionals and the public are not confused.

The potential long-term health effects most likely to occur, therefore, most important to consider, as a result of prolonged exposure to the plumes, would probably be effects on the respiratory system. Health effects would depend on the degree of exposure. Medically, one would consider analyzing data related to potential long-term effects if prolonged exposure to smoke had occurred. Fortunately, exposure was short lived. If exposure to severe particulate pollution had continued for many months, potential effects on the respiratory system could include a small loss in lung function or the development of chronic bronchitis. The exposure information available is not likely to place many troops in this category. These respiratory effects also might be more likely to occur in cigarette smokers.

Some of the hydrocarbons, measured at low concentrations in the smoke, have been shown to cause cancer in laboratory animals only at higher levels of exposure. Most epidemiologic studies of

health effects following prolonged exposures are based on many years of exposure to the chemicals of interest. Thus, it is difficult to extrapolate from those studies to the current situation, in which exposure changed daily as the wind shifted direction and more fires were capped. Based on the exposure information that has been assembled, we do not believe that there will be a detectable increase in lung cancer in Gulf War Veterans as a result of the oil well fires.

Mr. Chairman, the Public Health Service cares about the health of the U.S. military personnel who served in the Gulf and is committed to do its part to assist the Department of Defense. At present, we are peer reviewing the draft document "Interim Kuwait Oil Fire Health Risk Assessment" produced by the Kuwait Risk Assessment Team of the United States Army Environmental Hygiene Agency. PHS is also conducting its own "lessons learned" look back activity to identify what it learned from its health activities related to Desert Shield, Desert Storm, and the oil well fires in Kuwait.

Mr. Chairman, this concludes my testimony. My colleagues and I will be happy to answer any questions you may have.