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AND INTERNATIONAL RELATIONS  
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## MEMORANDUM

To: Members of the Subcommittee on National Security,  
Emerging Threats, and International Relations

From: Kristine K. McElroy

Subject: Briefing Memorandum for the hearing, *Examining the Status of  
Gulf War Research and Investigations on Gulf War Illnesses*,  
scheduled for Tuesday, June 1, 2004, at 1 p.m. in Room 2154,  
Rayburn House Office Building.

## PURPOSE OF THE HEARING

The purpose of the hearing is to assess the status of research on Gulf War illnesses and to look at General Accounting Office (GAO) findings regarding Persian Gulf War veterans' exposures to chemical warfare agents.

## HEARING ISSUES

- 1. What is the status of Gulf War Illnesses research and how can it be improved?**

## **2. How have exposure estimates affected research findings regarding Gulf War Illnesses?**

### **BACKGROUND**

In 1990, the Persian Gulf War brought together a number of international Coalition forces in response to Iraq's invasion of Kuwait. Iraq was suspected of possessing weapons of mass destruction (WMD), including nuclear, radiological, biological and chemical (NBC) weapons. Each nation in the Gulf War Coalition assessed the nature and extent of those threats and took a variety of defensive measures. Those included stockpiling and administering various drugs and vaccines, some of which were experimental.

Since the war's end in 1991, more than 125,000 U.S. veterans of the Gulf War have complained of illnesses. Typical complaints of Gulf War veterans are: flu-like symptoms, chronic fatigue, rashes, joint and muscle pain, headaches, memory loss, reproductive problems, depression, loss of concentration, and gastro-intestinal problems. Others suffer cancers, heart and lung problems, and amyotrophic lateral sclerosis (ALS) or Lou Gehrig's Disease.

Many believe they are suffering chronic disabling conditions as a result of wartime exposures to one or more of 33 toxic agents known to be present in the Gulf War theater of operations. Before, during and after the hostilities, U.S. troops were exposed to a variety of potentially hazardous substances. Potential exposures include chemical and biological warfare agents as well as pesticides, insect repellants, leaded diesel fuel, depleted uranium, oil well fires, infectious agents, the experimental drug pyridostigmine bromide (PB), and multiple vaccines including anthrax.

Exposures to WMD, along with defense measures against such exposures, have been evaluated by some researchers as possible causes of thousands of illnesses among United States (U.S.) and United Kingdom (U.K.) forces.

### **Federal Research on Gulf War Illnesses**

The federal government has sponsored 240 research projects on Gulf War illnesses. As of 2003, about 80% of these research projects have been

completed. In 1994, federal research was coordinated under the Persian Gulf Veterans Coordinating Board (PGVCB) and was composed of the Secretaries of VA, Defense (DOD), and Health & Human Services (HS). The Research Working Group (RWG) of the PGVCB had primary responsibility for managing research into Gulf War illnesses. However in 2000, the PGVCB was subsumed within the Military Veterans Health Coordinating Board (MVHCB). In 2002 the Deployment Health Work Group (DHWG) was established and the MVHCB was disbanded. In 2003 the DHWG established the Research Subcommittee to examine research related to the health of troops in all military deployments including the Gulf War. **(Attachment 1)**

The Deployment Health Working Group (DHWG) Research Subcommittee issued the 2002 Annual Report to Congress on Federally Sponsored Research on Gulf War Veterans' Illnesses on April 2004. According to the report, Federal Government funding for the direct cost of Gulf War research exceeded \$227 million from FY94 through FY02. This total does not include indirect costs of conducting the research such as facility, administrative and operational costs since indirect costs can only be computed by facility and not by project. VA estimates the indirect costs were close to \$70 million. **(Web Resource 1)**

The research reports are grouped according to ten focus areas: symptoms and general health status, brain and nervous system function, diagnosis, immune function, prevention, environmental toxicology, depleted uranium, chemical weapons, pyridostigmine bromide and interactions of exposures. **(Web Resource 1)**

### **Amyotrophic Lateral Sclerosis (ALS)**

On December 10, 2001, the Department of Veterans Affairs announced preliminary results of a study which found, "veterans who served in Desert Shield-Desert Storm are nearly twice as likely as their non-deployed counterparts to develop amyotrophic lateral sclerosis (ALS), commonly called Lou Gehrig's Disease." **(Attachment 2, p. 1)** ALS is a rare, chronic, and fatal disease of the nerves. Scientists do not know the cause of the illness, and there is no effective treatment for ALS. Only half of patients with ALS live more than three years. **(Attachment 2, p. 3)**

## **Research Advisory Committee**

The Research Advisory Committee on Gulf War Veterans' Illnesses (RACGWVI) was appointed by the Department of Veterans Affairs Secretary Anthony J. Principi on January 23, 2002, pursuant to Public law 105-368. The mission of the Committee is to, "make recommendations to the Secretary of Veterans Affairs on government research relating to the health consequences of military service in the Southwest Asia theater of operations during the Persian Gulf War." **(Web Resource 2)** The Committee is tasked with reviewing all relevant research, proposed federal research plans, initiatives, procurements and other activities in support of research projects on Gulf War-associated illnesses.

Members of the Committee consist of the general public, Persian Gulf War veterans, representatives of veterans and members of the medical and scientific community. The Committee is required to meet at least twice a year and to submit an annual report on the status and results of government research during the previous year. **(Web Resource 2)**

A June 25, 2002 Committee Interim report concluded Gulf War veterans "suffer from a pattern of health problems that significantly exceed those seen in comparable populations, beyond that which is explained by stress or psychiatric diagnoses, and different epidemiological studies consistently show 25-30% of the veterans who served in the Gulf are ill, over and above the control population chosen for each study." **(Web Resource 2)** The Committee also concluded, "it is increasingly evident that at least one important category of illness in Gulf War veterans is neurological in character, according to recent scientific studies." **(Web Resource 2)**

For example, Gulf War veterans are suffering from ALS at twice the expected rate. Studies have shown ill veterans have "elevated brain dopamine production," and have "low levels of an enzyme, paraoxonase, that is involved in breaking down organophosphate, and are more likely to have genotypes poor at metabolizing certain organophosphates, suggesting biochemical and genetic explanations for why some veterans become ill and others in the same location did not." **(Web Resource 2)**

The Committee report also concluded, “Many risk factors associated with Gulf War Illnesses are present today in Southwest Asia.” **(Web Resource 2)** These include exposures to environmental toxins, low-level nerve agents, depleted uranium, oil fires, mustard gas, and stress.” **(Web Resource 2)**

The Committee report made several recommendations including to use all available methods to identify and evaluate treatments that may hold promise for the unexplained illnesses experienced by Gulf War veterans, to enlist the expertise of specialists in neurobiology and neurological illness, to designate as a research priority the investigation of neurological mechanisms, and to increase funding to support these goals. **(Web Resource 2)**

### **Committee Report and Legislative Action**

The Presidential Advisory Committee on Gulf War Veterans' Illnesses (PAC) criticized the government's approach to research in a Special Report to the President in October 1997. According to the report, there appeared to be an inadequate response to external peer-review, less than adequate regard for the importance of allocating scarce research dollars to the best designed studies, inattention to the need to communicate effectively with veteran participants, and a need for better management of the research portfolio. **(Attachment 3, p. 10)**

On November 7, 1997 the Committee on Government Reform & Oversight approved the Subcommittee report which included 18 findings and 18 recommendations (House Report 105-388. "Gulf War Veterans' Illnesses: *VA and DoD continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects*"). **(Web Resources 3)** Among the findings and recommendations are several relating to research into the causes and treatments of Gulf War veterans' illnesses. **(Attachment 4, pp. 5-7)** Responding to persistent concerns about federal research and treatment programs on Gulf War veterans' illnesses, the Subcommittee report also called for legislative action.

In 1998, Congressman Shays and 213 bipartisan co-sponsors introduced *The Persian Gulf War Veterans Health Act of 1998* (H.R. 4036). The bill would establish in law the presumption of service-connection for illnesses associated with exposure to toxins present in the war theatre. The

VA Secretary would be required to accept the findings of an independent scientific body as to the illnesses linked with actual and presumed toxic exposures. By establishing a rebuttable presumption of exposure, and the presumption of service-connection for exposure effects, the bill placed the burden of proof on the VA, not the sick veteran. A similar bill, H.R. 4328, was included in the 1998 omnibus appropriations bill (under Title XVI, Division C, Sections 1601 & 1602), and enacted in October, Public Law 105-277. **(Web Resources 4)**

## **Plume Modeling For Chemical Exposures**

Plume modeling is used to recreate or predict the release and dispersion paths of hazardous materials and their effect on the health of the general population.

“The methodology for modeling the release of an agent is a process that includes:

- A source characterization to describe the type and amount of agent released, and how rapidly it discharged;
- Data from global weather models to simulate global weather patterns;
- Regional weather models to simulate the weather in the vicinity of the suspected agent release, and
- Transport and dispersion models (often simply called dispersion models) to project the possible spread of the agent as a result of the simulated regional weather.” **(Web Resource 5)**

At the end of Operation Desert Storm in 1991, US Army units were located in southeastern Iraq in an area that encompassed Khamisiyah (also known as Tall al Lahm Ammunition Storage Area). The army’s XVIII Airborne Corps conducted two large-scale demolition operations to destroy munitions and facilities around Khamisiyah.

On March 4, 1991, soldiers destroyed 37 ammunition bunkers. Iraq later declared one of the bunkers, Bunker 73, had 2,160 chemical warfare-filled rockets. On March 10, 1991, Soldiers destroyed 40 additional ammunition bunkers and 45 warehouses. In an open-air location outside the Khamisiyah Ammunition Supply Point (ASP) (also known as “the Pit”) soldiers destroyed 1,250 rockets, many of which the United Nations Special

Commission on Iraq (UNSCOM) later found contained chemical nerve agents sarin and cyclosarin.

In 1996, the Central Intelligence Agency (CIA) developed computer modeling to simulate the possible releases of chemical warfare agents from several sites in Iraq. However, the CIA only used a single model approach and the results showed the strengths and weaknesses of that model. On November 2, 1996, the DOD asked the Institute for Defense Analyses (IDA) to convene an independent panel of experts to evaluate previous modeling analyses. The panel recommended using several atmospheric models instead of relying on one model. **(Web Resource 5)**

The methodology behind Persian Gulf War modeling used local and global weather models and dispersions models. Weather models simulated the weather conditions in the area, and dispersion models simulated how chemical warfare agents may have moved in the atmosphere given the weather conditions. The models used characteristics of the agent such as the amount of the agent, type of agent, location of release, and release rate along with local weather to predict the agent's dispersal. The CIA, and reports by the United Nations Special Commission on Iraq provided source characterization for the modeling of Khamisiyah. The dispersion models used to model Khamisiyah used the same weather inputs and source characterization; however they yielded different results due to different assumptions. To account for these differences, a composite of all the various models was created.

The hazard projection graphics derived from the dispersion models were sent to the US Army Center for Health Promotion and Preventative Medicine (CHPPM). CHPPM used these graphics with data on US unit locations to create an exposure plot showing the areas and levels of possible exposure. As a result of DOD modeling efforts, 100,752 veterans were identified based on the plume modeling as possibly being exposed to low levels of nerve agent. **(Web Resource 5)**

### **Subcommittee Investigations**

The Subcommittee held a series of hearings on the "Status of Efforts To Identify Persian Gulf War Syndrome." During a Subcommittee hearing on September 19, 1996, James J. Tuite, III, International Security Consultant and Director, Gulf War Research Foundation, testified, "U.S. soldiers were

exposed to detectable levels of chemical warfare agent fallout from the aerial bombings of Iraqi chemical warfare agent research, production, and storage facilities by Coalition forces.” According to Mr. Tuite, “Archived meteorological data, including visible and infrared satellite imagery illustrates that the heat and smoke, and therefore the toxic debris, from these facilities traveled directly towards U.S. military personnel.”<sup>1</sup>

On June 2, 2003, the Subcommittee held a hearing entitled, *Following Toxic Clouds: Science and Assumptions in Plume Modeling*. At this hearing, the GAO provided a preliminary assessment of DOD plume modeling. GAO found, “DOD’s conclusion as to the extent of U.S. troops’ exposure is highly questionable because DOD and CIA plume modeling results are not reliable. In general, modeling is never precise enough to draw definitive conclusions, and DOD did not have accurate information on source term (such as the quantity and purity-concentration of the agent) and meteorological conditions (such as the wind and weather patterns), essential to valid modeling.” (**Attachment 5, p. 1**) GAO also found, “DOD’s conclusion, based on the finding of epidemiological studies—that there was no significant difference between rates of illness for exposed versus not exposed troops—is not valid. In the epidemiological studies, the results of DOD’s flawed modeling served as a key criterion for determining the exposure classification—exposed versus not exposed to chemical agents—of the troops.” (**Attachment 5, p. 1**) GAO will present their final assessment of DOD modeling at the hearing, along with another recent examination of the status of Gulf War Illnesses research.

Gulf War Veterans from the United Kingdom have also suffered from illnesses. Lord Alfred Morris of Manchester has been very active in these issues and participated in a January 24, 2002 Subcommittee Hearing entitled *Gulf War Veterans’ Illnesses: Health of Coalition Force*. Lord Morris also invited Subcommittee Members to participate in meetings in London on Gulf War Veterans’ illnesses. During these meetings Subcommittee members met Gulf War Veterans, parliamentarians and researchers from the United Kingdom. (**Web Resource 6**)

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<sup>1</sup> See Subcommittee files.

## DISCUSSION OF HEARING ISSUES

### 1. What is the status of Gulf War Illnesses research and how can it be improved?

There has been much progress in Gulf War Illnesses research. Recent studies have found a neurological element to Gulf War Illnesses. Studies have shown Gulf War veterans are suffering from ALS at twice the expected rate. These findings hold great promise for finding effective treatments for Gulf War illnesses.

However, there are concerns regarding funding for research. In an October 30, 2002, VA News release, VA Deputy Secretary Dr. Leo S. Mackay Jr., announced the Department of Veterans Affairs planned to, “make available up to \$20 million for research into Gulf War illnesses during fiscal year 2004, a figure twice the amount spent by VA in any previous year.” **(Attachment 6)** However, a June 2003 video transcript by Secretary of Veterans Affairs Anthony J. Principi stated, “we have doubled the funding available this year to VA investigators for research into Gulf War illnesses and other military deployments. These include large deployment to Bosnia and Kosovo, to Afghanistan, and most recently, Iraq, and smaller, recent deployment, such as to Panama, Haiti and Somalia.” **(Attachment 7, p. 1)** Thus, the news release was inaccurate and misleading, since it clearly stated \$20 million would be set aside for Gulf War illnesses research, not for all military deployments as Secretary Principi later stated. Currently, the VA has funded only one research project related to Gulf War illnesses research at a cost of \$450,000 for FY 2004. **(Attachment 8, p. 14)**

In recent years VA and DOD funding for Gulf War Illnesses research has decreased. The GAO will testify at the hearing that VA has not reassessed the extent to which the research projects have addressed the 21 key research questions. From 1995 to 1996, the Research Working Group identified 19 major research questions related to Gulf War Veterans illnesses. Two more questions were added later to create a total of 21 key research questions to serve as a guide for federal research on Gulf War illnesses. **(Attachment 8, pp. 32-33)** The last time VA did an assessment was in 2000, when the findings from only half of the research were available. **(Attachment 8, p. 2)**

The government has funded seven research projects dealing with cancer incidence among Gulf War veterans. However, GAO will testify there are several limitations which may affect research related to cancer incidence. For instance some cancers may take years to develop, and some research projects studying cancer incidence have not examined enough Gulf War veterans to reliably assess cancer incidence. Incomplete federal data on the health characteristics of Gulf War veterans may hamper research efforts. **(Attachment 8, p. 2)**

The GAO report also found the VA made it difficult for the Research Advisory Committee (RAC) to work effectively. The VA failed to provide RAC with complete or clear information regarding Gulf War Illness research and limited collaboration on research initiatives and program planning. **(Attachment 8, p. 2)**

The GAO will recommend the Secretary of VA conduct a reassessment of the Gulf War illnesses research strategy to determine whether the 21 key research question have been answered. The GAO will also recommend the Secretary of VA appoint a liaison who is knowledgeable about Gulf War illnesses research is appointed to routinely share information with the RAC, and ensure the research offices of the VA collaborate with the RAC on Gulf War illnesses research program developmental activities. **(Attachment 8, p. 2)**

## **2. How have exposure estimates affected research findings regarding Gulf War Illnesses?**

The DOD has conducted 50 investigations since 1996 on hazardous exposures during the Gulf War. As of April 2003, all investigations were complete. **(Attachment 8, p. 2)**

Plume modeling done by DOD estimated about 100,000 veterans were exposed to chemical weapons. This exposure information has been used in epidemiological studies. However, according to the GAO, the plume modeling done by DOD and CIA is inaccurate and flawed. Since source data was inaccurate, exposure models patterns cannot be accurately shown. As a result, research study based on these models has flaws since those in

the “unexposed” study group may have been exposed as well, invalidating comparisons.

Some say combining insufficient source information and meteorological data with limited information on troop location can lead to an artificial determination of exposures. GAO will testify DOD epidemiological studies are not valid since they are relying on inaccurate plume modeling to determine what group has been exposed and what group has not been exposed. Since it is difficult to assess the true exposure estimate, GAO will recommend the Secretary of DOD and the Secretary of VA not use the plume-modeling data for future epidemiological studies, since VA and DOD cannot know from the flawed plume modeling who was and who was not exposed. **(Attachment 9, p. 3)**

Mr. Jim Bunker will testify about his experience in obtaining State funding for Gulf War Illnesses research in Kansas, and recommendations he has for improving Gulf War Illnesses research.

Dr. Derek Hall will testify about Gulf War Illnesses research in the United Kingdom.

Dr. Janet Heinrich will testify about GAO findings and recommendations in the recent report entitled *Federal Gulf War Illnesses Research Strategy Needs Reassessment*.

Dr. Keith Rhodes, Chief General Accounting Office Technologist will testify about GAO findings and recommendations in the recent report entitled *Gulf War Illnesses: DOD Conclusions About U.S. Troops’ Exposure Cannot Be Adequately Supported*.

Mr. Jim Binns will testify about the work of the Research Advisory Committee on Gulf War Veterans Illnesses.

Mr. Steve Robinson will testify about recommendations he has for improving Gulf War Illnesses research.

Dr. Jonathan B. Perlin will testify about the role of the Department of Veterans Affairs in supporting Gulf War Illnesses research.

Dr. Robert Haley will testify about his research and findings regarding the incidence of Amyotrophic Lateral Sclerosis (ALS) in Gulf War Veterans.

Dr. Rogene Henderson will testify about her research and findings regarding low-level sarin exposures.

Dr. Paul Greengard will testify about his Noble Prize winning work in finding treatment for Parkinson's disease and how he feels a treatment can be found for Gulf War Illnesses.

The Honorable Lord Morris of Manchester, Member of the House of Lords, will be extended the parliamentary privilege of sitting on the dais with the Members of the Subcommittee. (**Attachment 10, p. 1**)

## ATTACHMENTS

1. “A Working Plan For Research On Persian Gulf Veterans’ Illnesses.” Persian Gulf Veterans Coordinating Board (November 1996).
2. “VA Links Gulf War, Lou Gehrig’s Disease,” *Washington Post*, (December 11, 2001).
3. “Presidential Advisory Committee on Gulf War Veterans’ Illnesses,” Special Report to the President (October 1997).
4. Summary, Findings & Recommendations. Government Reform & Oversight Committee Report. "Gulf War Veterans' Illnesses: VA, DOD Continue to Resist Strong Evidence Linking Toxic Causes to Chronic Health Effects," November 7, 1997 (House Report 105-388).
5. Highlights of “Gulf War Illnesses Preliminary Assessment of DOD Plume Modeling for U.S. Troops’ Exposure to Chemical Agents (GAO-03-833T), testimony before the House Subcommittee on National Security (June 2003).
6. Department of Veterans Affairs News Release entitled “VA Doubles Gulf War Research Funding,” (October 30, 2002).
7. Transcript of June 2003 video presentation by Secretary of Veterans Affairs Anthony J. Principi.
8. GAO Draft report entitled, “Federal Gulf War Illnesses Research Strategy Needs Reassessment,” GAO-04-767 (June 2004).
9. GAO Draft Report entitled “Gulf War Illnesses: DOD’s Conclusions About U.S. Troops’ Exposure Cannot Be Adequately Supported.” GAO-04-159 (May 2004)
10. Biography of Lord Alfred Morris of Manchester.

## WEB RESOURCES

1. Annual Report to Congress Federally Sponsored Research on Gulf War Veterans' Illnesses for 2002, Deployment Health Working Group Research Subcommittee. April 2004  
[http://www1.va.gov/resdev/prt/gulf\\_war\\_2002/GulfWarRpt02.pdf](http://www1.va.gov/resdev/prt/gulf_war_2002/GulfWarRpt02.pdf)
2. Research Advisory Committee On Gulf War Veterans' Illnesses  
<http://www1.va.gov/rac-gwvi/>
3. Government Reform & Oversight Committee Report, "Gulf War Veterans' Illnesses" (House Report 105-388) can be found on  
<http://www.house.gov/reform/reports/index.htm>
4. "The Persian Gulf Veterans Act of 1998" (H.R. 4328), an amendment include in the 1998 Omnibus Consolidated Appropriations Bill, and enacted in October 1998 under P.L. 105-277. <http://thomas.loc.gov/>
5. Case Narrative: US Demolition Operations at Khamisiyah Final Report (April 16, 2002) [http://www.gulflink.osd.mil/khamisiyah\\_iii/](http://www.gulflink.osd.mil/khamisiyah_iii/)
6. Subcommittee Hearing Transcript entitled, *Research Into Persian Gulf War Veterans' Illnesses*, Serial No. 107-237, October 10, 2002.  
<http://www.gpo.gov/congress/house/house07.html>