BURN PITS
"BREATHLESS IN BAGHDAD"

UNEXPLAINED SHORTNESS OF BREATH IN RETURNING CIVILIAN CONTRACTOR EMPLOYEES

I. What is a burn pit; and how long have they been in existence?

From approximately 2001 through at least April 26, 2010, the U.S. Military employed large open pits (essentially large excavated holes) which were then filled with waste of all matter and then lit on fire by jet fuel to dispose of the waste. Burn pits are located at every location wherein the military has positioned a Forward Operating Base (FOB). This includes the major U.S. Military staging base in the country of Djibouti on the horn of Africa.[1]

The most well known, and the largest burn pit was located in Iraq at Joint Base Balad. The air base at Balad is also referred to as Logistic Support Area (LSA) Anaconda, and is located in Northern Iraq, approximately 68 kilometers north of Baghdad. It encompasses a 25 square kilometer area and it houses approximately 25,000 military, civilian, and coalition personnel.

The U.S. Army Center for Health Promotion and Preventative Maintenance (USACHPPM), estimated that the amount of solid waste burned at Balad was two tons per day in the early stages of troop deployment and increased up to several hundred tons per day.

The Balad burn pit was approximately 10 acres in size. (Nearly the size of 10 football fields). The materials that were burned include; plastics and styrofoam, metal/aluminum cans, rubber, chemicals, (paints, solvents) petroleum and lubricant products, munitions and unexploded ordnance, wood waste, medical and human waste, and resulted in producing the

[1]See Training Letter April 26, 2010 Dept. of Veteran Affairs, Veterans Benefits Administration subject: "Environmental Hazards in Iraq, Afghanistan, and other Military Installations," Author Bradley G. Mayes, Director Compensation and Pension Service. (Hereinafter referred to as the "Training Letter.")

byproducts of incomplete combustion. The pits do not effectively burn the volume of waste generated, and smoke from the burn pit blows over the air base and into living areas.

The Department of Defense advised the Veterans Administration hereinafter ("VA") that as of October 2009, the Balad burn pits were shut down and incinerators were installed. As of the date of the April 26, 2010 "Training Letter," burn pits, "still operated at many other bases."

As of August, 2010, United States Central Command (CENTCOM) estimated that there were 251 burn pits in Afghanistan and 22 in Iraq.[2]

As of March 15, 2011,

> all burn pits in Iraq, serving more than 100 individuals, have now been closed, and programs are in place in Afghanistan to replace as many of the burn pits as is feasible. While we have been unable to identify any long-term health risks, on a population–wide basis, associated with high levels of airborne particulate matter and with burn pit smoke, we do not rule out that a small number of individuals may be adversely affected.[3]

As of May 18, 2011, W. Scott Gould, Deputy Secretary, U.S. Department of Veteran Affairs Statement before the United States Senate Committee on Veteran Affairs reported that

> VA is very concerned about any potential adverse health effects among Veterans as a result of exposure to toxins possibly produced by burn pits. VA has asked the Institute of Medicine (IOM) to review the literature on the health effects of such exposures. While it is possible some Veterans could experience health problems related to exposures to toxins possibly produced by burn pits, the extent of the impact on health is unknown at this time. IOM's examination of the scientific literature related to the burn pits in Iraq and Afghanistan also will determine what substances were burned in the pits and what byproducts were produced. We expect this study to be completed by early 2012…

[2] Afghanistan and Iraq: DOD should improve adherence to its guidance on open pit burning and solid waste management. GAO 11-63, October 15, 2010.

[3] Joint Statement by Clifford Stanley, Ph.D. Under Secretary of Defense (Personnel & Readiness) and Jonathan Woods, M.D. Assistant Secretary of Defense (Health Affairs) Regarding the Military Health System Overview before the House Armed Services Committee Military Personnel Committee, March 18, 2011.

According to recent discussions with the author's Claimants, burn pits are currently operating in Afghanistan (despite the presence of incinerators-yet to be installed).

If the Department of Defense is to be believed, air samples that were taken at Joint Base Balad, Iraq and Camp Lemonier, Djibouti, have not shown chemicals that exceed Military Exposure Guidelines. However, both soldiers and civilian contractors dispute the method by which the testing was performed claiming that the testing was conducted on a limited number of days and not when the wind was blowing in the direction of the camp.

Without getting into the very technical chemical components of the various offgassing caused by the burning of both organic and inorganic waste products, suffice it to say that Claimants are being exposed to toxic chemicals which have short-term and long-term adverse health effects.

THE VETERAN ADMINISTRATION'S RESPONSE TO POSSIBLE ADVERSE AFFECTS OF DESERT SAND AND BURN PITS

As of April 26, 2010, the VA was not "able to determine what possible adverse synergistic health affects might be caused by a combination of 1) high levels of particulate matter; 2) numerous toxic organic halogenated dioxins and furans; 3) known and unknown Polycyclic Aromatic Hydrocarbons; 4) known and unknown volatile organic compounds." For example, 22 of the identifiable toxins, not including dioxins and particulate matter, adversely affect the respiratory system; at least 20 affect the skin, at least 12 affect the eyes; and many others affect the liver, kidneys, central nervous system, cardiovascular system, reproductive system, peripheral nervous system and GI tract. See "Training letter."

This recognition by the VA of "environmental hazards" is helpful to those of us representing civilian contractors exposed to burn pit emissions and can be used by Claimants, in

exposure claims, to establish a known scientific link between burn pit emissions and, at the very least, respiratory illness.

"Regional office personnel must also be aware that many veterans suffering from illnesses such as, respiratory, cardiopulmonary, neurological, autoimmune, and/or skin disorders, may not associate such conditions with burn pit exposure. Such exposure may have been an accepted fact of life inside the theatre of operations." The same is true for civilian contractor employees - they just generally accepted what they were exposed to as being the "Iraqi Crud." Many of these Claimants upon initial interview, will complain that each morning they woke up form their sleeping quarters and they were coughing up, or sneezing out, black soot, or were increasingly becoming short of breath with minimal exertion. But, they did not connect the symptoms with any working condition(s) (in their mind as an accident or injury).

ARE BURN PITS IN IRAQ AND AFGHANISTAN MAKING SOLDIERS SICK?

Rick Lamberth, a former KBR employee, testified at a Senate Democratic Policy Committee that he witnessed the burning of various materials at the burn pits, the affects on his health, and his belief as to KBR's efforts to keep this information "from the public." See Senate Democratic Policy Committee Testimony of Rick Lamberth "Are Burn Pits in Iraq and Afghanistan Making Our Soldiers Sick?" Without focusing on Mr. Lamberth's testimony bearing on KBR's alleged efforts to deny its involvement in the operation of the burn pits, (subject of a lawsuit pending in the United States District Court- Maryland, Case Number: 8:09-MD-02083 RWT, In Re: KBR Burn Pit Litigation) Mr. Lamberth's testimony confirms that the burn pits were used to dispose of hazardous waste materials, including PCBs and nuclear, medical and biological waste, along with petroleum, oils, solvents and lubricants. He witnessed vermin, wild dogs and jackals roaming the burn pits and carrying off debris. In Iraq at camps at

Balad, Taji, Tikrit, Kirkuk, Camp Bucca, Camp Cropper and in Afghanistan at Bagram Air Field and Camp Phoenix, all among the largest bases operated in those theaters:

> The burn pits emitted plumes of smoke and gave off a foul smell. You can see mile-high clouds of smoke coming from the pits. Sometimes the smoke was light but mostly it was dark black. The ash that came from the pits looked like burned notebook paper and felt like a black, sooty snowfall. The ash covered the buildings and the ground like pollen dust. Soot from the pits would cover your clothes and stick to the walls of buildings.
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> The burn pits are varied in size and location. At Camp Speicher, there were six burn pits while I was there. During 2004 and 2006, my estimation is that there were a minimum of 100 burn pits operating in Iraq, and at least at 30 in Afghanistan. At Camp Speicher, one of the pits was 25 feet by 25 feet and about 50 to 60 feet deep. KBR built the pit upwind from the living quarters, so all smoke traveled downwind to where soldiers were living, which in some cases was as close as one quarter of a mile.

Mr. Lamberth concluded his testimony by reporting about his own health conditions. He had always been healthy, having joined the military straight out of high school-where he played three different sports. Since returning from Iraq and Afghanistan (having been exposed for a period of approximately 5 years) he is suffering from numerous respiratory problems. The military denied these claims on the basis that they "are EPTS-existed prior to service."

WHAT ARE THE COMPLAINTS BEING PRESENTED WITH IN THEATER?

According to Coleen P. Baird, M.D., M.P.H., F.A.C.O.E.M, United States Army Public Health Command (USAPHC), the top five respiratory in-theater encounters during the first quarter of 2006 were as follows:

1. Acute upper respiratory infections 29.8%
2. Acute nasopharyngitis (common cold) 13.4%
3. Acute bronchitis and bronchiolitis 9.9%
4. Asthma 9.7%

5. Chronic sinusitis 6.9%[4]

WHY DO SOME CLAIMANTS NOT IMMEDIATELY HAVE SYMPTOMS?

The patient's perception of shortness of breath is highly variable. According to Cecile Rose, M.D., M.P.H., a physician at the National Jewish Health Center, in Denver, Colorado, one of the world's leading experts in Occupational/Environmental Medicine and Pulmonary Medicine, it is remarkable as to how many people will just soldier on without feeling particularly symptomatic when their lung disease is actually rather substantial. So their perception of symptoms can be very variable and is not at all perfectly correlated with a person's lung function. However, the patient will generally report a worsening of their symptoms during deployment and refer to it as the "Iraqi Crud." When they first arrive in Iraq they notice a fairly rapid onset of upper respiratory symptoms including a cough, sometimes shortness of breath, runny nose and sinus congestion. They will often be treated by the base medic (if at all) with over-the-counter medications, occasionally treated with antibiotics with very little response. At that point in time there is not much more that can be done for them with the limited medical resources available (unless they leave theater).

The "Training Letter" also provides a reasonable explanation for a Claimant's delay in reporting and filing a Claim for Compensation for any illness that they may have been sustained while working at various bases-avoiding the statute of limitations for an occupational disease claim. Where the occupational illness does not result in immediate death or disability, claims are timely filed if done so within 2 years after the employee or claimant became aware, or in the exercise of reasonable diligence or by way of medical advice should have been aware, of the

[4] "Respiratory visits and conditions in Deployed and Redeployed Service Members-What do we know?" Presentation by Coleen P. Baird, M.D., M.P.H., F.A.C.O.E.M. at The American Thoracic Society, May 2011 Meeting.

relationship between the employment, and the death or disability; or within one year of the date of the last payment of compensation, whichever is later."[5]

Additionally, until the worker has knowledge that the condition will affect his earning capacity, the statute does not begin to run.[6]

IS IT THE BURN PITS OR CAN IT ALSO BE THE DESERT SAND STORM(S) THAT ARE CAUSING INJURY TO CIVILIAN CONTRACTOR EMPLOYEES?

"Particulate Matter ("PM") is a mixture of extremely small particles and liquid droplets. "PM" is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Although PM emissions from natural and manmade sources are generally found worldwide, the PM levels in southwest Asia are naturally higher and may present a health risk to service members." April 26, 2010 Training Letter.

What is recognized by both the VA and experts studying this phenomena as a result of a "Working Group," a multi-disciplinary group of pulmonary experts, occupational and environmental medicine physician, epidemiologists, toxicologists, industrial hygienists, geologists and military Department of Defense, Veterans Administration and civilian academics, is the size of the particles in the air in southwest Asia is much smaller in diameter (2.5 microns) than seen elsewhere in the world. The size of the particles has been directly linked to the potential for causing health problems. Particles that are 10 microns (PM10) in diameter, or smaller, are particles that can pass through the throat and nose, and into the lungs. "Once inhaled, these powder-like particles can affect the heart and lungs and cause serious health affects." April 26, 2010 Training letter.

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[5] 33 U.S.C. §913 (b)(2).

[6] See *Marathon Oil Co. v. Lundsford*, 733 F.2d. 1139 (5th Cir. 1984), *Newport News Shipbuilding & Drydock Co. v. Parker*, 935 F.2d 20 (4th Cir. 1991).

The source of PM in southwest Asia, includes dust storms and emissions from local industries: smelting factories, glass plants, battery manufacturers and obviously a host of businesses that were not subject to EPA emission regulations. Other sources of particulate matter include: IED blasts, battle smoke, vehicular exhaust, extremes of temperature and humidity, cigarette smoke and infectious agents. "The wide spread existence of burn pits only exacerbates the high concentrations of PM in Iraq and Afghanistan." The Department of Defense stated in its 2008 Balad Assessment that emissions from burn pits, among other things "may increase localized concentration of 2.5 micrometer PM and other potentially toxic air pollutants." April 26, 2010 "Training Letter."

Dr. Cecile Rose testified via deposition in *Lucas vs. SEII*, 2010-LDA-00297, that workers are exposed to the intense desert sand storms-a very fine powdery material-that often occurs in Iraq and Afghanistan. According to Dr. Rose, a comparison was made of desert sand storm particulate matter from various different sites in Iraq and Afghanistan and the sand found in the desert southwest of the United States. The investigators were able to demonstrate in an article published in the Journal of Inhalational Toxicology, that the levels of particulate matter exposure were substantially higher in southwest Asia compared to what would be found in typical urban or rural areas in the southwestern United States.[7]

Dr. Rose further testified that there is concern about the enhanced particulate matter that is found in the three major sources of inhalational exposure to men and women deployed in Iraq and Afghanistan: 1) geological dust-the desert dust; 2) burn pit smoke; 3) the very metal rich components that are attributed to exposures to local industries; for example, battery reclamation

[7] Dr. Cecile Rose Deposition P. 37 (hereinafter referred to as "Dr. Rose depo P.___")

facilities and smelters that may be located in proximity to FOBs or areas where military people are living and working.[8]

ANALYSIS OF DESERT DUST-WHAT DOES IT TELL US ABOUT LUNG RISK?

Geoffrey S. Plumlee, Ph.D., Senior Research Geochemist with the United States Geological Survey (USGS) specializing in the environment and human health presented at the May 18, 2011 American Thoracic Society Meeting "Analysis of Desert Dust-what does it tell us about lung risk?" Dr. Plumlee's analysis is that the desert dust in Iraq/Afghanistan has been linked to health hazards by numerous studies conducted by the Army Research laboratory at the University of Alaska - Fairbanks, and the University of Arizona; the United States Navy; the Desert Research Institute-U.S. Army Public Health Command, and the United States Geological Survey.

According to Dr. Plumlee the characteristics of Geo (anthropo)genic dusts that can influence health outcomes are as follows:

- Particle size, shape;
- Amounts of inhalable, respirable particles
- Mineral toxicants (crystalline silica, erionite, asbestos)
- Different minerals can trigger different inflammatory responses
- Metal/metalloid toxicants (lead, arsenic, iron, manganese, etc.)
- Oxidation of states of metal toxicants (i.e., Cr[VI] vs. Cr [III])
- Sorbed organic toxicants (mostly anthropogenic, some natural; pesticides, PAHs, PCBs, dioxins, etc.)

[8] Dr. Rose depo P. 40.

- Microbial pathogens (bacteria, fungi, viruses).

Dr. Plumlee has studied soil samples from 2 locations in Iraq, 1 in Kuwait, and Afghanistan and found that the dust particles show, under microscopic examination, clusters of bacteria on the particles themselves. Dr. Plumlee has studied whether the airborne particulate matter can exceed Military Exposure Guideline (MEGs) for PM10, PM 2.5, both 24-hour and 1 year and found that in all areas tested ranging from Djibouti, Bagram, Afghanistan, Khowst, Afghanistan, Qatar, United Arab Emirates, Balad, Iraq, Baghdad, Iraq, Talil, Iraq, Takrit, Iraq, Taji, Iraq, Al Asad, Iraq, Northern Kuwait, Central Kuwait, Coastal Kuwait, and Southern Kuwait the 1 year MEGs were exceeded for the smallest, most dangerous particles PM 2.5.

WHAT ROLE DO THE BURN PITS PLAY IN RESPIRATORY ILLNESS?

According to Pulmonary/Occupational Environmental Physician, Dr. Cecile Rose, organic compounds can be emitted when refuse is burned in the burn pits. For example, chromium, is a very toxic irritating substance that can make its way down deep into the lungs and is one of the constituents of the burn pits smoke that was investigated by the military. Additionally, one of the other chemicals of interest that was investigated are what are called dioxins (halogenated furans) that have been associated with a variety of adverse health effects. Dioxins have been previously cited in lawsuits as increasing the risk of cancer, in particular, lung cancer.

It was Dr. Rose's opinion, within a reasonable degree of medical probability, that the compounds and combustion products and the particulate matter have in, a variety of other non-deployment situations, been linked to adverse health effects (Parkinsons, tremors, various

cancers, sleep apnea, fatigue, chronic headaches, memory loss, neuropsychological decline) as well as pulmonary injury.[9]

Anthony Szema, M.D., Allergy Section, Veterans Affairs Medical Center, Northport, New York performed a retrospective review of active duty soldiers (2004-2010) registered at Veteran Affairs Medical Center, Northport, New York and concluded that new-onset Iraq/Afghanistan War Lung Injury is common and rates of symptoms lending to a diagnosis requiring spirometry are high.[10]

Dr. Szema and colleagues proposed the acronym IAW-LI for the clinical syndrome of fixed airway obstruction as a result of lung injury. In Dr. Szema's study, 14.5 % of soldiers returning from Iraq or Afghanistan had respiratory problems leading to spirometry, compared to 1.8% of those serving elsewhere. "The spirometry results are more consistent with some type of lung injury (causing irreversible declines in lung function) rather than asthma (causing reversible declines)."

THE MECHANISM OF LUNG INJURY

The mechanism of lung injury usually relates to inflammation. There is damage done to the airway and an influx of inflammatory cells or white blood cells try to respond to the injury. What happens next is that the airway becomes very inflamed and oftentimes the inflammatory cells, the white blood cells, then release their contents which are a certain kind of enzyme that will recruit or attract other white blood cells resulting in a sustained inflammation in the airways. The recruitment of additional inflammatory agents can lead to hypertrophy of the mucus glands and an increase in the number of mucus glands.

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[9] Deposition Dr. Cecile Rose – Page 36.
[10] J Occup Environ Med 2011, Sep, 53 (9) 961-5. Szema, AM, et. al. PMID 21866049

The patient will then have much more mucus secretions, causing a stimulation of the cough nerves in the airway. This triggers a persistent cough. Injury can occur to the lower part of the airway in what is called the terminal bronchiole, the respiratory bronchiole, and leading all the way out to the air sac or the alveolus where the patient will then have inflammation and injury and inflammatory cells that release enzymes (cytokines) that recruit other inflammatory cells causing a sustained or perpetuated process of inflammation that can then lead to emphysema. What is occurring during the repeated insult is the destruction of the alveolar walls causing them to breakdown and the air sacs within to lose their elasticity and their integrity. If injury occurs to the respiratory bronchiole (the very small airways at the end of the lungs) then it becomes narrowed and the bronchiole muscle contracts - leading to a bronchoconstriction - in either the small airways or the large airways. So, according to Dr. Rose, the inflammation process is the key mechanism for injury to the airway.

However, there are other mechanisms that are important in the context of emphysema. Oxidant injury occurs where free radicals, contained in the toxic inhalational exposure, can stimulate an injury and inflammation which results in the lungs attempt to repair the constriction of the muscles. While the lung is trying to repair itself, the excretion of certain enzymes (protease) can actually lead to the destruction of the air sacs.[11]

WHAT DO THE MEDICAL EXPERTS KNOW AND HOW DID THEY COME TO KNOW IT?-A NEW DISEASE HAS BEEN DISCOVERED "IRAQ AFGHANISTAN WAR LUNG INJURY ("IWLI")

Robert Miller, M.D., Associate Professor of Medicine, Allergy, Pulmonary and Critical Care, Vanderbilt University, was one of the first physicians to be challenged by the puzzling problem presented by returning military men and women from southwest Asia, who were

[11] Rose depo P.53-56.

complaining of shortness of breath, yet they presented with essentially normal pulmonary function tests.

Dr. Miller was able to convince Vanderbilt University to allow him to have the thoracic surgery department conduct open lung biopsies on patients who (while their CT scans, and pulmonary function tests appeared within the range of normal) were actually quite ill and there were no obvious objective diagnostic test results to support their claimed respiratory symptoms. Dr. Miller's team eventually performed lung biopsies on 49 soldiers (38 served in Iraq only, 10 served in Iraq and Afghanistan, and 1 served in Afghanistan only). Of the soldiers who were biopsied: 38 showed constrictive bronchiolitis; 2 respiratory bronchiolitis; 2 respiratory bronchiolitis-ILD; 2 hypersensitivity pneumonitis; 2 sarcoidosis; and 3 "other." The overwhelming majority of the patients showed pathological abnormalities consistent with constrictive bronchiolitis.[12] The median age at the initial visit for those with constrictive bronchiolitis was 33.4 +/- 6.1; and the male/female ratio was 35:3. Interestingly, only 7 of the 38 with constrictive bronchiolitis showed symptoms in theater. Twenty-five (25) had never smoked, 7 were former smokers, and 6 were current smokers.

Of the soldiers who were diagnosed with constrictive bronchiolitis, Dr. Miller sought to determine their "exposures." Of the 38 soldiers, 28 had been exposed to the sulfur fire; 33 to dust storms; 24 to burn pits; 18 to human waste incineration; 17 to combat smoke. There are distinctive pathologic characteristics to constrictive bronchiolitis (which are beyond the scope of this speech). Suffice it to say, under a microscope, the pathologists at Vanderbilt Medical Center were able to identify specific changes in the lung architecture which are recognized as

[12] Constrictive bronchiolitis is a narrowing of the tiniest and deepest airways of the lungs. It is rare and can only be diagnosed through lung biopsy. Vanderbilt Magazine, Fall 2010 "Airborne Toxins Damage Soldier's Lungs"

determinative of constrictive bronchiolitis. In greater than 64% of the soldiers who underwent open lung biopsies, approximately 22 bronchioles were involved.

Following cardio-pulmonary exercise testing, Dr. Miller's sample of 38 patients showed reduction in their ability to exercise.

Dr. Miller's conclusions were:

1. Constrictive bronchiolitis is associated with exercise limitation following service in the Middle East.
2. Many, but not all of those diagnosed, were exposed to sulfur dioxide.
3. Chest radiographs and HRCT failed to suggest the presence of disease.
4. PFTs and CPET were usually normal but significantly lower when compared to soldiers who had not been deployed.
5. **Patients tended to present post deployment.**[13]

WHY DID CONVENTIONAL STUDIES FAIL TO DETECT THE PRESENCE OF CONSTRICTIVE BRONCHIOLITIS?

During the recent presentation by various experts of the "Working Group" at the American Thoracic Society meeting in Denver, Colorado, in May, 2011, critical questions were presented and answers were provided that were like manna from heaven (at least to Claimant's attorneys handling Iraq - Afghanistan War Lung Injury "IAW-LI" claims).

The bronchioles are the terminal airways leading from the bronchi that contain the alveolar sacs. According to Dr. Miller, the alveolar sacs have large cross sectional areas compared to other airways; that contribute little to airway resistance; but may have considerable disease before the onset of symptoms; and PFT's do not detect early lesions.

[13] Robert Miller, M.D., "Constrictive Bronchiolitis Following Service in Iraq and Afghanistan, American Thoracic Society Meeting, May 18, 2011.

WON'T RADIOGRAPHIC STUDIES SHOW CONSTRICTIVE BRONCHIOLITIS?

In Dr. Miller's study of 32 soldiers, 23 (61%) showed normal radiographic results. Only 13% showed mild air trapping; 11% showed multiple nodules less than 1 cm; 8% showed a solitary nodule less than 1 cm; 3% showed bibasilar scarring; and 3% showed apical bullae.

WHY DOESN'T PULOMONARY FUNCTION TESTING ALWAYS CONFIRM THE PATIENT'S LUNG DYSFUNCTION?

Of the 38 soldiers who underwent pulmonary function testing, 13 were normal; 19 showed reduced DLCO only (Diffusing Capacity of the Lung for Carbon Monoxide); 3 showed restrictive bronchiolitis; 2 showed obstructive bronchiolitis; 1 showed mixed bronchiolitis.

FEV 1 (% PRED) Forced Expiratory Volume in one second	86.7 ± 13.3
FVC % PRED Forced Vital Capacity – a measurement of the total air exhaled after a deep inhalation	90.3 + 13.2
FEV 1/FVC (%)	79.1 ± 7.6
TLC (% PRED) Total Lung Capacity-total amount of air in the lungs after a maximal inhalation	96.1 ± 15.5
DLCO (% PRED) Diffusing Capacity of the Lung for Carbon Monoxide	73.4 ± 15.4

When compared to other military (non-deployed) service members, Dr. Miller's patient's showed a decrease in pulmonary function testing from the comparison group in the above-tested categories, except for Total Lung Capacity (TLC).

THE ROLE OF CIGARETTE SMOKING, PRE-EXISTING ASTHMA AND EXACERBATION OF PRE-EXISTING SYMPTOMS FOLLOWING DEPLOYMENT

The synergistic effect (an effect where two or more things combined may be greater than the sum of their parts) has been definitively established as causing an increased risk of lung cancer in persons who are exposed both to asbestos and to tobacco smoke. The interaction between those two substances results in a multiplicative affect on the risk for lung cancer. However, Dr. Rose, testifying in the context of deployment exposures indicated "I think we don't know yet what the interaction is between deployment exposures and cigarette smoking, whether there is a synergistic affect or an additive affect, that's why this is such an important area for further investigation."[14]

Dr. Rose does believe that people with asthma, and who are already smoking, are more likely to report symptoms or exacerbation of pre-existing symptoms after deployment because those individual's airways have already been injured from the pre-existing asthma or the effects from smoking and its inflammation of the airways. The added impact of particulate matter and other constituents of deployment inhalational exposures may take an already damaged or injured airway and make it even more susceptible to harm. People who have a history of tobacco abuse, already have an impaired lung defense mechanism leading to the lung's inability to withstand the additional insult or additional exposure.

DEFENSE ARGUMENTS: IT'S ALL ABOUT SMOKING

Typically, as was asserted in *Lucas vs. SEII,* (Case No. 2010-LDA-00297), (the case resolved days before the Final Hearing) the defense will claim that the Claimant's prolonged cigarette smoking history was solely the cause of his pulmonary disorder. While, certainly

[14] Rose Deposition P. 40-41.

prolonged cigarette smoking complicates the case, to another degree, it may actually work to your client's benefit-as it pre-disposes them to the inability to withstand further insult from occupational exposures.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

Chronic cigarette smoking will certainly result in a pre-deployment diagnosis and/or defense argument (assuming no pre-deployment diagnosis was made) that the Claimant already suffered from Chronic Obstructive Pulmonary Disease (COPD).[15] COPD is defined as: FEV1/FVC<70% and FEV1<80%.[16] While, there is no doubt that cigarette smoking is the number one cause of COPD, there is also absolutely no doubt that it is not the only cause of COPD. COPD can be aggravated by inhalational exposures. Recent epidemiologic data shows that there are certain occupations that are statistically significantly associated with the risk for COPD, including emphysema, even when controlled for smoking.

MILLENNIUM COHORT STUDY

The Millennium Cohort Study[17], a study launched in October, 2000 in response to a DOD recommendation for a coordinated effort to study the potential health effects of deployment-related exposures and the Institute of Medicine recommendation for a systematic assessment of service member's health began in July, 2001 and was completed in June, 2003. The participants' responses have been used to investigate the incidence of self-reported respiratory symptoms

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[15] COPD is a term used to describe chronic air flow obstruction that is mainly associated with emphysema and chronic bronchitis.

[16] Hnizdo, et. al.; Am J Epid 2002; 156: 738-746.

[17] "Epidemiology of respiratory illnesses from the Iraq war and Afghanistan" Smith, Am J Epid 2009 170(11): 1433-1442.

Emphysema-causes inflammation with the small airways and the fragile walls of the air sacs. This inflammation can destroy some of the wall's elasticity and cause small airways to collapse when you exhale, stale air is trapped in your lungs, leaving you to work harder to get adequate oxygen in and carbon dioxide out. Destruction of the air sacs prevents oxygen from getting into the blood stream and creates holes in the lungs contributing to breathlessness.

Chronic bronchitis: characterized by ongoing persistent inflammation, causes excessive production of mucus that blocks the airways. A normal bronchiole tube will appear as a clear pipe; an abnormal bronchiole tube will be narrowed by excessive mucus formation and inflammation.

(persistent or recurring cough or shortness of breath) asthma, and chronic bronchitis or emphysema. The study found when looking at a very large population (46,000 participants) of U.S. military men and women who were deployed to southwest Asia, (versus non-deployed) that there was a statistically significantly increased rate of respiratory symptoms including cough and shortness of breath in people who were returning from deployment in Iraq and Afghanistan (14% deployed versus 10% non-deployed). All that this study could look at, was symptoms, because the military does not do pre and post-deployment spirometry studies.

What is, of course, relevant is the duration of deployment, and the exposure to desert sand storm and burn pit emissions. Thus, the closer (in proximity) your claimant was to the burn pits either at their living quarters or at their worksite, together with the length of time that they were exposed to the harmful conditions, the more likely a physician will agree that there is a correlation between their symptoms and pulmonary dysfunction due to burn pit emissions and desert sandstorm particulate matter. But, there was inconsistency in risk with cumulative exposure time-implicating specific exposures-rather than deployment in general. Even controlling for cigarette smoking, mere employment in the Armed Services in southwest Asia was a risk factor for COPD.[18]

While research is still being conducted by doctors at the National Jewish Health Center and Vanderbilt University Medical Center, there are adequate patient populations that have been studied at both centers, as well as peer reviewed studies, showing a correlation between the exposure to desert sand storm particulate matter and burn pit emissions that should assist us in establishing that pulmonary dysfunction (the heretofore unexplained shortness of breath) is now explainable.

[18] See, Millenium Cohort Study. Id.

OTHER DEFENSES ASSERTED BY EMPLOYER/CARRIER'S TO PULMONARY INJURY CLAIMS

Additionally, the defense to these claims of pulmonary dysfunction, is that the Claimant already had damage to their lungs due to previous work/and environmental exposures. That defense, is easily defused, by the last injurious exposure doctrine.

The defense will also harp on the issue of the length of time that your Claimant was exposed to the burn pits; the distance that they were from the burn pits; and the prevailing winds. Obviously, you as Claimant's counsel, will not find through discovery proof of daily wind patterns, nor industrial hygiene studies for each base/camp. However, that is, in my opinion, completely unnecessary.[19] There is sufficient evidence of harmful working conditions (which is all you need) to establish along with complaints and physical symptoms of respiratory injury, to establish a *prima facie* claim for respiratory problems due to the desert sand storm and/or toxic burn pit emissions. And armed with the necessary expert medical testimony to rebut the defense's burden of showing that there is no possible effect on the Claimant's respiratory system the Claimant should prevail on compensability.

Obviously, Dr. Miller's study concluding that patients tend to present post deployment with pulmonary symptoms dispels common myths that are being bandied about by defense attorneys: "[W]hen someone is exposed to airborne contaminants as described as being released by the burn pits, the individual commonly experiences symptoms of loss of consciousness, coughing and respiratory distress, lasting only for a few hours to a day." This testimony was

[19] "All that is required is that the obligations or conditions of employment create the "zone of special danger" out of which the injury arose." *O'Leary v. Brown-Pacific-Maxon, Inc.*, 340 U.S. 504, 506-507 (1951). "The zone of special danger is well suited to cases, like this one, arising under the Defense Base Act, since conditions of the employment place the employee in a foreign setting where he is exposed to dangerous conditions." Chamberlin v. Service Employees International, Inc. 2010-LDA-184 (August 10, 2011). Citing, *N.R. v. Halliburton Services*, 42 BRBS 56 (June 30, 2005).

accepted by Administrative Law Judge, Honorable Lee J. Romero, Jr. in *Eddie Hall v. Service Employees International, Inc.*, 2010-LDA-2004 (April 14, 2011).

Unfortunately, in Hall, the only evidence Hall provided as to the "dangers of the burn pits," was a letter by the Department of Veteran Affairs warning of environmental hazards in military installations. Hall presented the testimony of a rheumatologist, Dr. Lugo, and was seeking to establish his fibromyalgia and resulting fatigue was due to the water he was exposed to and burn pit smoke.

The Employer's expert, Dr. Wayne Snodgrass, M.D. (subspecialty in medical toxicology and clinical pharmacology) opined that neither the over-chlorinated water, or the non-potable water caused the Claimant's fibromyalgia. He further testified that based on his experience with fire toxicology, as well as research of relevant data, "...no connection exists between fibromyalgia and exposure to substances and fire or smoke." Dr. Snodgrass's testimony regarding acute symptoms of "loss of consciousness, coughing and respiratory distress lasting only for a few hours to a day" are refutable by doctors who are experts in the field: Dr. Anthony Szema, Dr. Robert Miller, and Dr. Rose. However, it is incumbent upon Claimant's counsel to use the most recent research from the American Thoracic Society's May, 2011 meeting to rebut any "junk science" testimony.

Four months later in *Paul Chamberlin v. Service Employees International, Inc.*, 2010-LDA-184 (August 10, 2011) the same Administrative Law Judge, Lee J. Romero, Jr., was, again, faced with a Claimant who was claiming exposure to desert dust storms and breathing in smoke and fumes from the burn pits, but now was alleged to have suffered pulmonary dysfunction. In *Chamberlin,* the Claimant had reported that after 4 deployments (and having passed physicals each time) he began to experience, nearly 1 year into his fourth deployment, difficulties

breathing and coughing up mucus. As did many other civilian employees (as well as soldiers) he began taking over-the-counter medication in order reach his goal of staying in until the end of his 1 year contract. The Claimant did see Army doctors who confirmed the medic's diagnosis that the Claimant was suffering from pneumonia. Thereafter, the Claimant sought out a pulmonologist whose reports indicated that the Claimant was suffering with mixed obstructive and restrictive ventilatory defects as well as residual exertional dyspnea.

Dr. Lewis Hamer, a Board Certified physician in Pulmonary and Critical Care Medicine, retained by the carrier agreed that the Claimant's pulmonary condition was causally and directly related to the Claimant's work performed in Iraq. Specifically, that the pulmonary condition was the result of repeated exposure to toxic fumes from bombings and mortar fire. (Interestingly, the doctor did not relate the exposure to the burn pits.) Notwithstanding that slight omission, Claimants can, and should, prevail on claims of pulmonary disorders due to a multitude of exposures whether it be burn pit emissions or multiday exposures to particulate matter from local and regional sources during windy periods; intense exposures to particulate matter from more regional, and some local sources during dust storms.

HOW DO WE PROVE THAT OUR CLIENTS' INJURIES ARE RELATED TO HARMFUL WORKING CONDITIONS THAT THEY WERE EXPOSED TO IN IRAQ AND AFGHANISTAN DUE TO BURN PIT OR DESERT SAND STORM PARTICULATE MATTER?

Unlike military service members, who generally did not have pre-deployment pulmonary function tests, many contractors required spirometry testing prior to approving the hiring of civilian contractor employees. KBR's pre-employment medical questionnaire requires the prospective employee to complete a fairly extensive review of systems and medical history. Thereafter, the Claimant is evaluated by an OccuCare physician, in Houston, Texas who then performs a physical examination, does a drug screen, obtains blood, performs a Pulmonary

Function Test, audiometric test, chest x-ray, and EKG (if applicable). The Pulmonary Function Test (PFT) will provide you with the Claimant's baseline lung capacity (assuming no prior PFTs). As you will come to find, even if the post-deployment PFT test is normal; it does not, and should not, mean that your client does not have a respiratory illness. Some of the pre-employment PFTs will reveal that your Claimant had early signs of respiratory illness (many due to a longstanding history of smoking) however, the clinic doctor misread the results.

The good news is that the chest x-ray will, almost always have been read as normal. Otherwise, the Claimant should not have been allowed to work in theater (Iraq and Afghanistan). As many of you may have found out, the Claimant is actually not an "employee" of Halliburton-KBR, but rather a foreign entity, Service Employees International, Inc. (SEII). When investigating a potential "burn pit" case make sure your Request to Produce, includes Claimant's pre-employment PFT's, chest x-ray report, health questionnaire and results of the examining physician's report, and the entire personnel file; and obtain directly from OccuCare the chest x-ray film (most likely it will be of poor quality, over penetrated and black).

WHAT IS THE MEDICAL PROOF THAT YOU ARE LOOKING FOR TO REBUT THE CARRIER'S CONTENTION THAT THE BURN PITS AND DESERT SAND STORM DID NOT CAUSE, CONTRIBUTE TO CAUSING, OR AGGRAVATE A PRE-EXISTING LUNG DISORDER?

1) Spirometry studies comparing pulmonary function tests conducted pre-deployment with pulmonary function testing done post deployment.

2) Chest x-rays and high resolution lung CT scans.

3) Lung biopsies.

4) Credible, top notch, leading pulmonary experts' knowledge of the literature and the studies demonstrating the adverse health affects of exposures to burn pit emissions and desert sand storm particulate matter on pulmonary function.

Without getting into the aspects of very technical pulmonary function testing, suffice it to say that the testing equipment should be calibrated before each use, and should be operated by a competent technician. At National Jewish Health Center, pulmonary function tests are performed by respiratory therapists or respiratory technicians, certified by NIOSH who are trained to record appropriate information including the height of the patient and other demographic information so that they can provide the necessary information to compare to the predicted normal values. They need to be trained to coach the patients in how to do the flow maneuvers in a way that is reproducible, and the testing needs to be valid and reliable.

DEFENSE TRICKS OF PULMONARY EXPERTS

Be mindful of the defense medical expert's pulmonary function testing report and the actual flow volume curves. The flow volume curves will give you a printout of all the different pulmonary maneuvers. It shows the shape of the inspiratory and expiratory loop as the person takes a deep breath in and then breathes out. To determine the adequacy of the testing you have to obtain the raw data. Just as in neuropsychological testing, many of the defense pulmonologists will only provide you a summary of the report, and not provide you with the underlying flow volume curves.

Make sure that you obtain all the raw data, including the flow volume curves as part of your Request for Production from the Employer/Carrier and/or Notice of Production from Non-Party from the defense medical expert. Additionally, be sure that when you receive the Pulmonary Function Test report, you have your expert review it to determine whether the doctor has properly interpreted the test result(s) as to whether each test is within the normal range. One of the unfortunate tricks that a pulmonary expert could engage in is to comment only on one test

result, to show that it was not below the supposed cutoff for the normal predicted range (ignoring the results that do show below normal readings).

In particular, individuals with poor diffusion capacity will have inflated lungs which cause them the inability (when they take a deep breath in) to blow out air because of the damage to the alveoli and the small airways. Generally, a diffusion capacity that is abnormal tends to go along with an abnormal chest x-ray that shows hyperinflation of the lungs.

Quite frankly, the real "Gold Standard" (when PFT's, chest x-rays and CT scans of the lungs are within normal range) in determining whether a Claimant has substantial lung dysfunction is a surgical lung biopsy usually (if done) by a thoracic surgeon. This is not to be undertaken lightly. Your client is going to be exposed to the risks of a surgical procedure, including having their chest wall cut open into, and pieces of their lung tissue removed for pathological examination. Obvious risks of the procedure are pneumothorax and infection.

In fact, Dr. Miller at Vanderbilt Medical Center, and Dr. Rose at National Jewish Health have been on the forefront of advocating that patients who after having undergone Pulmonary Function Tests, (showing relatively normal lung function) unremarkable CT scans of the lungs and chest x-rays – may benefit from having open lung biopsies to provide objective pathological evidence of lung disease. The cost of performing the workup at a tertiary center such as National Jewish Health and Vanderbilt Medical Center including the evaluation, consultations, diagnostic studies, surgical fees, pathology fees and hospital charges can run easily upwards of $40,000.00. In cases where your client's claim has been controverted, unless your Claimant has health insurance, this is an expense that none of us are likely to front the cost for.

BE WARY OF OTHER STUDIES
"WHAT ABOUT ENCOUNTERS FOR RESPIRATORY CONDITIONS?" (ABRAHAM/WEESE/DEBAKEY, 2010)

- Overall rate of respiratory encounters decreased post deployment compared to pre-deployment
- Decrease driven by decreased respiratory infections
- Rates of encounters for obstructive conditions (primarily bronchitis and asthma) increased
- Length of deployment and number of deployments were not associated with increased rates

THE WORKING GROUP PROPOSED REFERRAL CRITERIA FOR FURTHER DIAGNOSTIC TESTING

- Persistent unexplained cough, shortness of breath or wheezing/chest tightness
- Any abnormality on spirometry (<LLN)
- 15% decline in FEV1 or FVC post-deployment
- 10% decline in spirometry along with new onset respiratory symptoms
- Significant decline in physical readiness/fitness test

THE RECOMMENDED DIAGNOSTIC APPROACH

- Complete medical and occupational environmental health questionnaire
- Full PFTs (lung volumes- DLCO, pre and post-bronchodilator)
- Chest HRCT (inspiratory/expiratory, prone/supine)
- Methacholine challenge
- Metabolic exercise testing
- Consider surgical lung biopsy

PROPOSED CASE DEFINITION: DEPLOYMENT-RELATED ASTHMA

- Persistent shortness of breath, cough, wheezing, chest tightness and either
- Reversible air flow limitation on pre- and post bronchodilator PFTs

  OR

- Positive methacholine challenge

  PLUS

- No pre-deployment history of asthma

PROPOSED CASE DEFINITION: DEPLOYMENT-RELATED CONSTRICTIVE BRONCHIOLITIS

- Persistent unexplained respiratory symptoms and at least 2:

  1. Fixed airflow obstruction (pre and post bronchodilator PFTs)

  2. Mosaic attenuation/air trapping on HRCT

  3. Clinically significant gas exchange abnormalities or abnormal VO2 max;

     OR

  4. CB on surgical lung biopsy as determined by an experienced pulmonary pathologist

FINDINGS ON SURGICAL BIOSPY ARE OFTENTIMES INDICATIVE OF MUCH MORE SEVERE DISEASE THAN NOTED ON PULMONARY FUNCTION TESTS OR CT SCANS

The findings on surgical lung biopsy are oftentimes more substantial than what the pulmonary experts had predicted based on the claimant's chest CT scan and their pulmonary function test. According to Dr. Rose, the short answer for this discrepancy is quite frankly "I don't know." The "more thoughtful answer" is that when an injury to the small distal airways occurs, the clinical tools that physicians have are fairly unreliable, except when the injury to the

small airways is extremely extensive. The small airways are the silent part of the lung where you can have an awful lot of abnormality on a biopsy and not be able to see it very well on a CT scan. What may be seen on lung biopsy is pathology of more severe emphysema than is shown on the CT scan. Inflammatory damage to the distal airways with mucus plugging (a lot of pigmentation of the macrophages[20]) often appears on lung biopsy showing much more inflammatory damage to the distal airways than one would expect even with a fairly significant smoking history.

CONCLUSION

There is now scientific evidence of the previously unexplainable shortness of breath experienced by returning civilian contractor employees now termed Iraq Afghanistan War Lung Injury (IAW-LI). To effectively represent Claimants complaining of pulmonary symptoms, counsel must take a detailed intake including a history of all environmental exposures, employment history, medical history; obtain all available medical records; prior workers' compensation and injury claims; employment records, and familiarize yourself with the peer reviewed literature. If possible, have your client evaluated by a physician with significant experience in pulmonary, occupational and environmental medicine. And, be prepared to spend significant time and money as the case will be fiercely defended. But, with the right Claimant and hard work you can, and should, prevail.

[20] A macrophage is a white blood cell that acts as part of the lung's defense, scrubbing the lung of particulate matter.