

LOCAL TITLE: AMB CARE//C&P EXAM  
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AUTHOR: [REDACTED] EXP COSIGNER:  
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Camp Lejeune Contaminated Water (CLCW)  
Disability Benefits Questionnaire

Name of patient/Veteran: [REDACTED]

Utilize this template for free text entries regarding CLCW cases and/or pasting CLCW documents, such as templated reports.

Name: [REDACTED]  
Date: July 12, 2017  
Date of Birth: Date of Birth: [REDACTED]; Age 87  
Sex: Male  
Dates of military service: March 11, 1952 - March 10, 1954  
Dates of service at Camp Lejeune: June 3, 1952-October 9, 1952\*, November 14, 1952-April 21, 1953\*, October 11, 1953-March 10, 1954 (per 2507); 150 days or 0.41 years.

\*According to the Agency for Toxic Substances and Disease Registry (ATSDR), a part of the Centers for Disease Control and Prevention (CDC), on their Camp Lejeune, North Carolina, Water Modeling FAQs webpage ([http://www.atsdr.cdc.gov/sites/lejeune/faq\\_water.html](http://www.atsdr.cdc.gov/sites/lejeune/faq_water.html)) the contaminated drinking water system at Camp Lejeune exceeded its current EPA maximum contaminant level, of at least one VOC in finished water, between August 1953 and January 1985. Therefore August 1, 1953 is taken as the beginning date for the contamination. As a result only the Veteran's third period at Camp Lejeune is relevant to this discussion.

The following report was based on review of records and relevant scientific literature.

Reviewer: [REDACTED], MD, MPH  
Member, Subject Matter Expert Panel  
Camp Lejeune Contaminated Water Project  
Time Dedicated to this review: 180 Minutes

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Contention, the veteran claims the following condition as secondary to exposure to CLCW:

Contention 1: The Veteran has been diagnosed with bladder cancer.

Diagnosis: The Veteran was diagnosed with bladder cancer on January 14, 2008 at age 78.

Documents reviewed: VBMS, CPRS  
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Contention, the veteran claims the following condition as secondary to

exposure to CLCW:

Contention 2: If the diagnosis of bladder cancer is confirmed, it is secondary to exposure to CLCW.

Nexus: The diagnosis of bladder cancer is confirmed, but is less likely than not caused by or a result of the Veteran's exposure to CLCW.

Discussion: The term cancer actually refers to a very large number of different diseases. Cancer of the various blood forming cells are not only different from cancers in solid organs, but are also different from each other. Solid organs include everything from the intestines, to bones, to lung, colon, prostate, brain, pancreas, skin, etc. Many solid organs can develop several different types of cancer which can be differentiated under the microscope and sometimes by location within the organ. Cancer from one organ may spread (metastasize) to other organs. When cancer spreads it remains the same cell type as where it originated. Therefore when prostate cancer metastasizes to bone or lung tissue, it remains prostate cancer and can be identified as such under the microscope, through certain biochemical tests and through its response to treatment.

The American Cancer Society (ACS) identifies several risk factors for the development of bladder cancer. These include: Smoking - which they identify as the most important risk factor (1-3), accounting for half of all bladder cancers in men and women; Workplace exposures - including aromatic amines and in industries like makers of rubber, leather, textiles, and paint products as well as printing companies. Other workers with an increased risk of developing bladder cancer include painters, machinists, printers, hairdressers (likely because of heavy exposure to hair dyes), and truck drivers (likely because of exposure to diesel fumes); Race - Caucasians are twice as likely to develop bladder cancer than are African Americans; Age - 90% of people with bladder cancer are over 55 years old; Gender - bladder cancer is much more common in men than in women; Chronic bladder problem; History of bladder cancer; Bladder birth defects; Genetics and family history; Chemotherapy and radiation therapy; Certain medicines - including the diabetes drug pioglitazone (Actos); Arsenic in drinking water; and Low fluid consumption (3).

The ACS also reports that they estimated that 74,000 cases of bladder cancer would be diagnosed in the US in 2015, in a ratio of men to women of 3.19 to 1 (1). Further that the lifetime risk of developing bladder cancer in men is 1 in 26, i.e., 4% of men, if they live long enough, will develop bladder cancer. The ACS, as well as several other major informational web sites reminds its readers "having a risk factor, or even several, does not mean that you will get the disease. Many people with risk factors never develop bladder cancer, while others with this disease may have few or no known risk factors."

After extensive research of the scientific literature, the only studies identified that found a statistically significant association between exposure to tetrachloroethylene (PERC) or trichloroethylene (TCE) and an increased rate of development of bladder cancer did so in occupationally exposed groups (4-10),. There were no studies identified that indicated such an increase after environmental or residential exposures to PERC or TCE.

Most of the published studies of solvent exposures and bladder cancer looked at occupational exposure to PERC and TCE (4-19). Review of these studies indicates that occupational exposures to these solvents were much higher among workers as compared to the estimated residential exposures while service members were stationed at Camp Lejeune. Since the studies that have looked at the question have failed to find an increased risk of bladder cancer in the low and medium work place exposure categories, it makes sense that there is no increased risk of bladder cancer following exposure to an even lower level of PERC and/or TCE, such as existed at Camp Lejeune.

An increased incidence of bladder cancer was identified in aniline dye workers as far back as 1895 (20). However, many studies have failed to find any correlation at all between exposure to TCE or PERC (4-6) and an increased risk of bladder cancer, whereas some have found an association only with either high levels of exposure or long periods of exposure (typically greater than 5 years) (7-9).

The National Academy of Science, in 2009 (21), determined that there was Limited/Suggestive Evidence of an association between exposure, specifically to PERC, and the development of bladder cancer. These studies indicate that after occupational exposure for at least 5 years, there may be an increased risk of developing bladder cancer. Many other studies in the literature have found either non-significant or equivocal increase in risk after workplace exposure (10-20). Therefore, with the possible exception of significant occupational exposure (which is greater than the estimated CLCW exposure) to PERC or TCE for greater than 5 years, there is no scientifically documented link between exposure to either of these solvents and an increased risk of developing bladder cancer. Therefore based on the Veteran's estimated solvent exposure during his five months (150 days) of exposure at Camp Lejeune, ending in 1954, one would expect no health effect.

In a Canadian study published in February 2013 (19), the authors found that the majority of the associations examined between chlorinated solvent exposures and the development of 11 sites of cancer were null. Out of these 11 cancer sites, they found two associations that had significantly elevated odds ratios (ORs), exposure to these solvents and development of bladder cancer was not one of them.

A 2014 Agency for Toxic Substances and Disease Registry (ATSDR) study by Bove, et al. evaluated a cohort (group) of Camp Lejeune (CL) civilians with an average employment on base of 2.5 years (22). They found lower risks of bladder cancer in both the exposed CL cohort and a control Camp Pendleton (CP) cohort when compared to the general population. They also found a lower risk in the CL cohort when compared to the CP cohort (all of these differences were not statically significant). In another 2014 study by Bove, et al. a group of CL marines and navy personnel with an average exposure of 18 months were compared to a comparable group of CP military personnel. Once again, the authors found lower risks of bladder cancer in the exposed CL cohort, but not in the CP cohort when compared to the general population. They also once again found a lower risk in the CL cohort when compared to the CP cohort (all of these differences were not statically significant) (23). [REDACTED] total time at CL was approximately 0.41 years or five months, thus only a fraction of the amount of time spent at Camp Lejeune by the groups in either of these studies. In neither of the studies did the CL group have an increase in bladder cancer,

therefore once again one would expect no effect in [REDACTED].

The Institute of Medicine conducted an extensive review of the literature, which looked at solvent exposure and an increased risk of various health effects (24). The Committee report states "The committee concludes, from its assessment of the epidemiologic literature, that there is limited/suggestive evidence of an association between chronic exposure to tetrachloroethylene and dry-cleaning solvents and bladder cancer (25). The Committee further states "The committee concludes, from its assessment of the epidemiologic literature, that there is inadequate/insufficient evidence to determine whether an association exists between chronic exposure to other solvents under review and bladder cancer (25). Thus, the strongest evidence that was located regarding the four solvents of interest and bladder cancer was for PERC and this was limited/suggestive. The scientific literature is replete with multiple studies demonstrating the connection between smoking and other well established risk factors. In addition, it is questionable if 150 days qualifies as chronic exposure.

The Agency for Toxic Substances and Disease Registry (ATSDR) website on health effects linked with solvent exposure at Camp Lejeune, identifies bladder cancer as a reported health problem in people of all ages from drinking water contaminated with TCE and/or PCE (26). The website references a single study (27), the authors of which state that there was an increased relative risk of bladder cancer among subjects whose exposure level was over the 90th percentile, although even this finding was not statistically significant. Interestingly, the same ATSDR website does not identify bladder cancer as a reported health problem in people of all ages from working with TCE and/or PCE include, or benzene, or vinyl chloride (26).

A 2011 study indicated that the proportion of bladder cancer cases attributable to ever-smoking is 66% for all men and 73% for men younger than 60 (28). The American Cancer Society reported in June 2015 that "Approximately half of the deaths from cancers of the oral cavity, esophagus, and urinary bladder were due to smoking" (29).

Cancer Research UK (30) (the British equivalent of the American Cancer Society) identified several chemicals on its web site that are known to cause bladder cancer. These are arylamines and include: Aniline dyes; 2-Naphthylamine; 4-Aminobiphenyl; Xenylamine; Benzidine; and O-toluidine. They also identify polycyclic aromatic hydrocarbons (PAHs) as chemicals which are known to increase the risk of developing bladder cancer, however the chemicals known to have been contaminating the groundwater at CL are not PAHs. Industries and occupations such as rubber and plastics manufacturers, bus and taxi drivers, railroad workers, metal casters, machine setters and operators, leather workers, blacksmiths, hairdressers, mechanics, miners, and painters all have been demonstrated to have an increased incidence of bladder cancer, but not such professions as dry cleaners or refinery workers.

Mr. [REDACTED] is a Caucasian male, who was diagnosed with bladder cancer at the age of 78. He is a lifetime non-smoker, although it is unknown whether he had significant exposure to second hand smoke. He had only 0.41 years of exposure to CLCW, or five months, which is far less than the exposure of any group in whom a study identified even an equivocal association with bladder cancer. Those studies that have come closest to being conclusive about

solvent exposure and bladder cancer generally do so only after at least five years of substantial exposure, not five months of exposure. Mr. ██████ CLCW exposure ended in 1954, which was 54 years prior to his bladder cancer diagnosis. This is an extremely long latency and not consistent with general toxicologic and oncologic expectations.

Therefore, based upon the currently available literature, his short exposure history (150 days), the very long latency between the end of exposure and the diagnosis, i.e., 54 years, his age at diagnosis (78), his race, and his gender, and his bladder outlet obstruction from his BPH, it is my opinion that Mr. ██████ bladder cancer is less likely as not caused by or related to his exposure to CLCW.

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Available evidence of record were reviewed; applicable evidence is summarized below:

VBMS, CPRS, JLV review:

" CPRS Problem List includes: Obesity; Hypertension; Sleep apnea; Colonic polyps; Atrial fibrillation; Adenocarcinoma of prostate; Coronary artery disease; Rosacea; Diabetes mellitus; Hyperlipidemia; Nephrolithiasis.

" 12/31/2007 G. Madsen, PA - CC: Blood in urine. HPI: 78-year-old male patient presents to urgent care due to blood in his urine which he has been noticing for the past five days though he did not have any today. PMH: Hypertension, Skin cancer, Glucose intolerance, Colonic polyps, Renal insufficiency, Benign prostatic hypertrophy. Basic metabolic panel: BUN of 25. Creatinine 1.5 which is stable compared to his prior panels. EGFR - 48 (reduced).

" 1/14/2008 Pre-op H&P - Bernard is a pleasant 78-year-old male who was doing well until developing an episode of gross hematuria back in December. The gross hematuria lasted approximately 24 hours. He did pass a few small clots and had some urinary frequency, but no dysuria. Medically, Mr. [REDACTED] has a history of hypertension and glucose intolerance, also mild renal insufficiency and a history of BPH. SH: The patient is a nonsmoker, nondrinker, with seven children. Retired farmer. Married.

" 1/14/2008 Cystoscopy with TURBT, resection of bladder neck, partial prostatectomy - Pathology: Grade 3, stage T1 transitional cell carcinoma of the bladder.

" 8/13/2008 Pre-Op H&P - Pre-TURBT - PMH: 1) Hypertension which has been well controlled. 2) Glucose intolerance. 3) He has a history of colon polyps. 4) Renal insufficiency. His creatinine returned at 1.4 with an EGFR of 52. 5) BPH. 6) Anaphylaxis to bees. 7) Pulmonary embolus. Patient was diagnosed February 2008 with bilateral pulmonary emboli. HOSPITALIZATIONS: 1) Bladder tumor and bladder outlet obstruction secondary to BPH in January 2008. 2) Pulmonary emboli in February 2008. FH: F died @72 heart; M died @94; Several uncles died of heart; 1 of 3 Bro with colon cancer. SH: Retired farmer but still works on farm helping his kids. No tobacco use. Rarely alcohol. Height 177 cm., Weight 100.2 kg (BMI 32.0).

" 5/9/2017 C&P GU - Bladder Cancer Diagnosis 2008. Resection 2008, high-grade disease, Bladder cancer, stage T1, grade 2-3.

/es/ [REDACTED], MD, MPH  
Occupational and Environmental Medicine Physician  
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