Navy and Marine Corps Public Health Center

Public Health Report for

Camp Justice

21 Aug 2015

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Executive Summary

In response to a hotline complaint received by the Department of Defense (DoD) Inspector General (IG), the Navy and Marine Corps Public Health Center (NMCPHC) was asked by Commander Navy Region Southeast (CNRSE) to conduct a Public Health Review (PHR) of the DoD Office of Military Commissions (OMC) buildings located on Camp Justice at Naval Station (NS) Guantanamo Bay (GTMO). The hotline complaint alleged that since 2004, military and civilian members working for OMC have been exposed to carcinogens in an area surrounding the Commissions' trailers, tents, offices and courtrooms.

NMPCHC sent a team of public health experts to NS GTMO 4-8 August 2015 to conduct a preliminary investigation including performing an industrial hygiene and habitability survey of the OMC buildings, tents, and trailers at Camp Justice. Based on a review of available documents, the walk-through and results of the air sampling performed, it was determined, in concurrence with the 2013 NMCPHC Habitability Assessment Report, that the buildings, tents, and trailers where people live and work are habitable for occupancy. Administrative worksites are low hazard and have little potential for overexposures to current occupational health standards. Therefore, based on these industrial hygiene findings, none of the OMC personnel working in these buildings of concern are required to be enrolled in occupational medical surveillance or require occupational certification examinations.

Although the buildings of concern have been deemed habitable, environmental records for Camp Justice are limited. For example, an environmental site assessment and monitoring which might have included testing of the air, soil, drinking water, groundwater, etc. has not been conducted as would have been required under existing policy (MCM 0028-07, 02 Nov 2007, "Procedures for Deployment Health Surveillance"; DoDI 6490.03, 11 Aug 2006 "Deployment Health"; DoDI 6200.04, 09 Oct 2004 "Force Health Protection"). Additionally, there is limited historical information regarding former operations that occurred onsite (e.g., hangar, maintenance, flight line activities, etc.) and/or potential spills or releases to the environment (e.g., locations of fuel tanks; use, storage, and disposal of solvents from work processes; etc.). Consequently, there is insufficient evidence available at this time to address the potential environmental exposures to carcinogens that were alleged in the complaint. To reduce this uncertainty, NMCPHC has identified environmental data gaps and recommends additional environmental sampling be performed at Camp Justice to appropriately address the complaint and allow the epidemiological investigation to be completed.

This Public Health Report addresses actions taken to date to address the complaint, which include:

- Performing an epidemiological review of medical data bases to confirm the diagnosis of cancer and type of cancer
- Reviewing medical literature to determine known environmental risk factors for each confirmed cancer type
- Gathering and reviewing available historical occupational and environmental data
- Conducting an on-site walk-through survey of living and work environments, which included a preliminary air sampling effort
- Assessing the need for collecting additional environmental data to fill currently existing data gaps

NMCPHC follows the Centers for Disease Control and Prevention (CDC) guidelines for the investigation of suspected cancer clusters, which involves gathering and reviewing information about site-specific occupational and environmental hazards and the process for performing an epidemiological investigation. A formal cancer cluster investigation is not supported because the number and various types of cancer cases validated in this review do not meet the minimum criteria recommended by the Centers of Disease Control and Prevention.

Based on the types and number of cancers observed, the recognized risk factors and latency periods, it is unlikely that an environmental or occupational exposure is associated with these cancers. Review of the limited environmental data did not indicate any unexpected environmental exposures. Further epidemiologic study will be considered if the recommended public health review determines that there is an elevated human health risk due to environmental exposures.

If additional environmental data is collected by CNRSE, and a human health risk assessment report is completed by NMCPHC, NMCPHC recommends posting this report to the NS GTMO Webpage and conducting Town Hall Meetings to roll out the final results to the stakeholders (internal and external).

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Table of Contents

Tables

Figures

Section 1 – Introduction

On 14 July 2015, the DoD IG received a health risk complaint from the OMC. The complaint alleges that OMC military and civilian personnel were likely exposed to carcinogens and that seven (7) individuals were alleged to have been diagnosed with cancer. The complaint alleges that the old commissions' buildings potentially contain asbestos and possibly other carcinogens and the new commissions' building was built on the old runway and could be contaminated. Lastly, the OMC location of tents and trailers used for housing may have been a dumping ground for fuel in the past. On 16 July, the complaint was assigned to Commander, Naval Installations Command (CNIC) as a Command Referral and initial information was shared with CNRSE. On 22 July, CNIC formally tasked CNRSE to conduct an initial inquiry into the allegation. On 22 July, CNRSE formally requested NMCPHC to perform a Public Health Review (PHR) of the alleged exposure to carcinogens in the area surrounding the commissions' trailers, tents, and offices and courtroom buildings.

NMCPHC immediately began an epidemiological investigation to verify the medical diagnosis of the 7 individuals alleged to have been diagnosed with cancer. On 4-8 August, NMPCHC sent a team of public health experts to NS GTMO to conduct a preliminary investigation. That investigation included an epidemiology, industrial hygiene, drinking water and habitability survey of the OMC buildings, tents and trailers at Camp Justice, a historical records review, and risk communication training (see Table 1).

NAME	LOCATION	DESCRIPTION
AV29 OMC Headquarters		
AV31 Communications Bunker		
AV32 Media Operations Center		
AV34 Old Commission Building		
ELC-1 Courtroom Trailer		
ELC-2 Defense Trailer		
ELC-3 OMC Security Trailer		
ELC-4 Prosecution Trailer		
ELC-8		
ELC-14		
CLO D-1 Defense Berthing		
CJ26 Cuzco		
A-5 Work Control (BEEF)		
E-1 Roads & Grounds Shop		
E-2 Structures Shop		
E-3 Utility Shop		
E-4 HVAC Shop		
E-5 Power Production Shop		

Table 1: Office of Military Commissions Structures Visited by PHR Team

The public health experts also reviewed the documents applicable to their area of expertise and summarized the findings and potential gaps in information (data gaps), and provided preliminary recommendations based on the document review. This report is organized as follows:

Section 1: Introduction

Section 2: Public Health Review (PHR) Evaluations

Section 3: Additional Issues

Appendix A: Cancer Clusters and Risk Communication

Appendix B: Industrial Hygiene Indoor Air Sampling for Benzene

Setting

Camp Justice Setting

Camp Justice was established at Naval Station Guantanamo Bay (NS GTMO) by the 474th Expeditionary Civil Engineering Squadron (474th ECES). The camp is located on the windward side of NS GTMO at the abandoned McCalla Airfield and supports the Expeditionary Legal Complex (ELC) and Office of Military Commissions (OMC). The first phase of construction began in July 2007 and included the installation of the lodging facilities and utility infrastructure. The second phase of construction began in September 2007, which centered on ELC construction and ongoing improvements to the cantonment and life support areas of Camp Justice. The camp was completed and met its design requirements in January 2008 and is currently managed by the United States Air Force (USAF) Base Engineer Emergency Force (BEEF).

Camp Justice has the capacity to house up to 500 personnel billeted and assigned to the OMC, security guards, journalists and logistics, operations and maintenance staff. Camp Justice and the ELC are comprised of 150 structures consisting of a courthouse, 15 administrative support facilities, and an expeditionary lodging facility (tent city). Camp Justice, the ELC and the OMC administration buildings adjacent to Camp Justice are collectively known as the Area of Operation (AO) Patriot (see Figure 2).

AO Patriot sits within NS GTMO. The base is located on the southeast corner of Cuba at the entrance of the Guantanamo Bay, 14 miles south of Guantanamo city as seen in the aerial view in Figure 1. The NS GTMO complex consists of the windward and leeward sides and comprises 45 square miles.

Figure 1: Aerial View of Naval Station Guantanamo

The land portion of Naval Station is enclosed by a wire perimeter fence patrolled by the United States Marine Corps Security Force Company – Guantanamo Bay (MCSFCO). NS GTMO is the hub of US military operations in the Caribbean Theater of Operations providing logistics support to the United States Navy (USN), United States Coast Guard (USCG), authorized air operations and the Joint Task Force Guantanamo (JTF GTMO). NS GTMO is populated by nearly 6,000 US service members, Department of Defense (DoD) and other government civilian employees, contract employees (from several countries) and family members of all groups.

Figure 2: Aerial View of Camp Justice

Major tenant commands include; JTF GTMO, U.S. Naval Hospital Guantanamo (NH GTMO), MCSFCO, Personnel Support Activity, Naval Atlantic Meteorology and Oceanography Command Detachment, Department of Defense Education Activity, International Organization for Migration, Naval Media Center Detachment, Naval Facilities Engineering Command Southeast - Public Works Detachment, and USCG Aviation Detachment.

Demographics

JTF GTMO is a U.S. military joint task force based at NS GTMO, which falls under SOUTHCOM, located on the southeastern end of the NS (see Figures 1 and 2 above). There are personnel assigned to JTF GTMO, including: military personnel, civilian personnel, contractors, and other residents (see Table 1).

NS GTMO and JTF GTMO Demographics		
NS	**Type**	**JTF**
	Military	
	Civil Service	
	Contractors	
	Spouses (Non-working)	
	Children (Non-working)	
	Other Residents (Third Country Nationals)	
	Total	

Table 2: NS GTMO and JTF GTMO Demographics

The Office of Military Commissions (OMC) has facilities located at JTF GTMO. From 2008, to the present, the number of personnel supporting the OMC has varied from 4 to 20 staff members who are considered permanent party working in AV29 or AV34. Most of the OMC personnel work in AV29. Additional information regarding specific personnel at GTMO as a result of supporting OMC is included below and in Table 2.

Office of Military Commissions – Camp Justice	
Expeditionary Facilities	**Construction Date**
Camp Justice Berthing Tents	Constructed 2005 by JTF BEEF
- Expeditionary Legal Complex	Constructed 2008 by JTF BEEF
- Cuzco Berthing Modular Trailers	Constructed 2008 by NAVFAC contract
- Cuzco Berthing Modular Trailers	Constructed 2012 by NAVFAC contract
Pre-existing Facilities	
– AV29 OMC (working offices)	1942, OMC in 2007
– AV31 OMC Communications	1942, OMC in 2004
– AV32 OMC McCalla Hangar (media)	1941, OMC in 2007
– AV34 OMC Courtroom/Offices	1941, OMC in 2007

Table 3: OMC – Camp Justice

AIRFORCE BASE ENGINEER EMERGENCY FORCE (BEEF)

The BEEF staff has varied between personnel. They work in tents located in Camp Justice. Until 2011 they also berthed in tents in Camp Justice but now berth in unaccompanied housing facilities at NS GTMO.

COMMISSIONS LIASION OFFICE (CLO)

Staffing for the CLO, formerly the Commissions Support Group (CSG), is comprised of Navy and Army military staff members that are on a nine-month rotation. While the current number of staff is there have been as many as These individuals primarily work out of AV34 and berth in unaccompanied housing facilities at NS GTMO.

TRANSIENT PERSONNEL (DURING COMMISSIONS)

Since 2008, OMC presence has increased. There are civilian positions that have a turnover rate. Additionally, there are approximately contractors who have worked for OMC since 2008. When commissions are in progress, personnel are allowed to sleep in soft shelter tents or rigid walled shelters (also known as Cuzcos) in Camp Justice or reside in Navy Gateway Inns and Suites (NGIS) lodging.

During commissions, there are media and non-governmental observers present to observe the hearing. Over the years, it is estimated that there have been 1,000 such individuals, who either stay for a single week or come regularly such as media. These individuals sleep in tents in Camp Justice and often work in the hangar or observe hearings in the courtroom. When commissions are in progress, supporting personnel berth for short durations (1-2 weeks; 2 to 4 times per year).

Section 2 – Public Health Review (PHR) Evaluations

Subject Matter Experts (SMEs) in industrial hygiene, habitability, drinking water, environmental restoration, occupational and environmental medicine, and epidemiology reviewed the documents provided by CNRSE, NAVFAC SE, NAVFAC Atlantic, NS Guantanamo Bay, USNH GTMO, JTF GTMO, OMC and SOUTHCOM. Based on the document reviews and walk-through survey, the SMEs summarized their findings, identified data gaps, and provided recommendations. The results are presented in this section, by specialty.

Epidemiology

Purpose

At the request of Navy Medicine East, Navy and Marine Corps Public Health Center (NMCPHC) conducted a review of an alleged cancer cluster in a Navy Hotline Request from the Department of Defense Inspector General (DOD IG). NMCPHC EpiData Center was tasked to: (1) review service members' medical records named in the original IG complaint to determine if there was sufficient evidence to confirm a diagnosis of cancer and (2) conduct an epidemiologic investigation if warranted.

Methods

Case Validation

Commander Navy Installations Command Inspector General provided a list of military members with personal identifying information in connection with the DOD IG complaint and Department of the Navy Inspector General (DON IG) provided a roster of all military personnel assigned for duty at the Office of the Military Commissions (OMC) in Naval Station Guantanamo Bay. The combined information was used to identify medical diagnosis and treatment records in the Military Health System electronic medical data sources – medical encounter, treatment, prescription, radiology, and pathology records in AHLTA and diagnosis and treatment records in the Standard Inpatient Data Records, Standard Ambulatory Data Records, Comprehensive Ambulatory Professional Encounter Records, and the DOD Automated Cancer Tumor Registry (ACTUR). Because cancer care may exceed the capabilities of the local military treatment facility, diagnosis and treatment codes were also searched in TRICARE ambulatory and inpatient reimbursement claims databases (Institutional and Non-institutional TRICARE Encounter Data). These databases serve as an archive of all MHS health care encounters and medical claims data and allow searching on personal identifiers to obtain cancer diagnosis and treatment codes. This review would not include any cases that were diagnosed or treated after a person separated from the military if the care was not within or reimbursed by the MHS.

The case definition for cancer used in this review consisted of the following: [1]

1. At least one inpatient discharge or three outpatient visits with a diagnosis code for malignant cancer within a 90-day period or
2. A diagnosis code for malignant cancer with treatment codes (i.e. chemotherapy or radiotherapy) consistent with the type of cancer.

Cancer Cluster Determination Methods

The Centers for Disease Control and Prevention published guidelines to determine if a cancer cluster investigation is warranted and the process for conducting the investigation. The definition of a cancer cluster is a greater number than expected of the same or related cancer cases in a population that shared the same location over the same period of time.[2] There are several points to consider when addressing a suspected cancer cluster. First, types of cancer vary in causes, predisposing risk factors (i.e. genetics), target organs, and the rates of occurrence. Second, cancers are often caused by a combination of factors that interact in a way that are not fully understood. Finally, the time since first exposure to the suspected agent and the diagnosis of cancer (latency) is typically decades, making it very difficult to link past exposure to the cancer.[2] If a cancer cluster investigation is not recommended by the guidelines, a case series analysis will be provided. The case series analysis consists of a review of the available medical information for each cancer type and peer-reviewed cancer literature to describe the associated risk factors and latency.

For this investigation, the latency for each of the suspected cases will be measured using the first date of arrival in Guantanamo Bay from the OMC roster to the date of first diagnosis of the suspected cancer from the medical records.

Results

Case Validation Results

Based on the list of names provided by CNIC IG, the following information is provided:

Case Number	Source	Cancer validation	Type	Time from First Arrival in GTMO and Diagnosis (years)	OMC Roster *
1	Original IG complaint	Confirmed	Metastatic appendiceal adenocarcinoid tumor	8.7	Yes
2	Original IG complaint	Confirmed	Brain cancer	Unknown	No
3	Original IG complaint	Not valid	NA	NA	Yes
4	Original IG complaint	Confirmed	Marginal zone lymphoma	2.6	Yes
5	Original IG complaint	Confirmed	Colorectal cancer	4.0	Yes
6	Original IG complaint	Confirmed	Myxoid liposarcoma	6.3	Yes
7	Original IG complaint	Not valid	NA	NA	No
8	Supplemental IG	Confirmed	Breast cancer	6.7	Yes
9	Supplemental IG	Confirmed	Colorectal cancer	7.7	Yes
10	Supplemental IG	Confirmed	Melanoma in brain	2.8	Yes
11	CNIC JAG/FOIA	Confirmed	Blastic plasmacytoid dendritic cell neoplasm	3.8	Yes

*OMC roster received from Navy IG on 12 AUG 2015

Table 4: Case validation of suspected cancers, Navy Inspector General Hotline complaint, 201502145, 16 July 2015

The case validation process identified eight different cancers diagnosed in nine individuals, of which eight were found on the OMC roster. The latent periods ranged from 2.6 years to 8.7 years.

Cancer Cluster Results

At this point in time, the number and types of cancer investigated in this investigation do not meet the CDC definition of a cancer cluster and a formal cluster investigation is not scientifically supported. A case analysis was conducted to describe any risk factors that might be shared amongst the cases.

Case Series Results

Environmental risk factors and latencies for each of the validated cancers:

Brain

- Risk factors: exposure to ionizing radiation; history of radiation treatments or a high number of diagnostic x-rays, especially in the head area.[3]
- Latency: 10-20 years following exposure to ionizing radiation.[4]

Melanoma

- Risk factors: UV radiation from the sun or tanning beds[5]
- Latency: For the primary tumor, the latency period is about 10-40 years from first significant UV exposure.[6,7] For metastatic melanoma, the period of dormancy between the initial diagnosis of cutaneous melanoma and the diagnosis of metastatic melanoma is about 10 years.[8]

Appendiceal adenocarcinoid

- Risk factors: No known environmental risk factors.[9]
- Latency: No established latency period.

Colorectal

- Risk factors: No known environmental risk factors. Lifestyle risk factors include smoking, inactive lifestyle, and heavy alcohol use. [10]
- Latency: No known latency due to environmental exposure. Latency period associated with exposure to tobacco smoke is 30-40 years.[11]

Myxoid liposarcoma

- Risk factors: Exposure to ionizing radiation, typically during medical treatment, in the area of the tumor.[12]
- Latency: The median latency period for all radiation-induced sarcomas is about 10 years.[13]

Breast

- Risk factors: Radiation therapy in the chest area as children or young adults.[14]
- Latency: 15-20 years for exposure to ionizing radiation.[15]

Blastic plasmacytoid dendritic cell neoplasm

- Risk factors: No known risk factors.[16]
- Latency: No known latency period.[16]

Marginal zone lymphoma

- Risk factors: Chronic *Heliobacter pylori* infection.[17]
- Latency: None reported.[17]

The predominant risk factor shared among the nine cases was exposure to ionizing radiation. Occupational and environmental exposures to ionizing radiation include medical diagnostic and treatment equipment, non-destructive testing of materials using radioactive sources, naturally occurring radioactive materials like radon, and living or working at or near nuclear power plants. The latency period for the cancers with known latency periods was 10 years or greater, while the longest period from a person's first arrival at OMC to diagnosis was about 9 years.

Discussion

This study identified eight different types of cancer among nine people. According to the Centers for Disease Control and Prevention, cancer is the second leading cause of death in the United States, with one in four deaths attributable to some form of cancer. Approximately one in two men and one in three women will be diagnosed with some form of cancer in their lifetime. Because cancer is so common, cases might appear to occur with alarming frequency within a community even when the number of cases is within the expected rate for the population. As the population ages in any given community, many residents will eventually be diagnosed with some type of cancer, thus adding to the perception of an excess of cancer cases in a community. Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and lifestyle behaviors such as diet and smoking. Also, a statistically significant excess of cancer cases can occur within a given population without a discernible cause and might be a chance occurrence.[2]

For cancer to be associated with an environmental or occupational exposure, a pathway from the exposure to the individual must exist. The fact that an exposure to a carcinogenic agent occurred does not make the diagnosis of cancer inevitable. The risk of cancer due to external exposures is based on two factors – the frequency and intensity of exposure to a carcinogenic agent and the susceptibility of the individual. The person's genetics, lifestyle choices, and the level of mental and physical stress on the body govern the susceptibility of the individual.[18] For an epidemiology study to be meaningful, a pathway from the exposure to the individual must be established and there must be a sufficient number of cases to study. Further study of service members stationed at OMC will be considered if the recommended environmental sampling review determines that there is an elevated risk due to environmental exposures.

Findings and Recommendations

1. Based on the types and number of cancers observed, the recognized risk factors and latency periods, it is unlikely that an environmental or occupational exposure is associated with the cancers. The term "unlikely" is used in this case due to the uncertainty created by the lack of a complete environmental site assessment of the OMC site. Review of the limited environmental data did not indicate any unexpected environmental exposures. Further study will be considered if the recommended public health review determines that there is an elevated human health risk due to environmental exposures.
2. Make this report available to OMC personnel. Feedback from other investigations has indicated that the contents of this report provided useful information when discussing an individual's cancer risk with a medical provider.

Limitations

The primary limitations for this study were inaccurate coding of cases and accurate ascertainment of member. This study depended solely on the identifiers provided by CNIC IG. Clinical coding of cancer is subject to the diligence of the medical provider to enter the proper code into the health record. Because the method found all cancer diagnoses first and then applied the case definition, the chance that a case was missed due to inconsistent coding was reduced. Every avenue was used to observe case information in both administrative and clinical records. Information contained in this report is current as of 19 August 2015.

Encounter Data

Encounter data maintained at the EpiData Center (EDC) are routinely generated within the Composite Health Care System (CHCS) at fixed-military treatment facilities (MTFs). Encounter data consist of ambulatory clinical encounters and inpatient discharges. Purchased care records are only available for inpatient and ambulatory care and are based on claims data submitted to TRICARE. Due to data source changes, ambulatory data before 1 January 2012 have four diagnosis fields, and data after this date have ten. The number of cases for a particular condition will likely appear to increase after 1 January 2012 even if the actual number of individuals with the condition did not. This change will affect case counts over years and may make comparisons more difficult to interpret. Inpatient records are created at discharge or transfer and have 20 diagnosis fields.

Diagnoses in medical encounters depend on correct International Classification of Diseases, 9th Revision (ICD-9) coding practices. Data for medical surveillance are considered provisional and medical case counts may change if the record is updated after the report is generated. Additionally, because records are submitted into the system at different times, there may be patients who had an inpatient or outpatient encounter but were not captured in the current data.

Documents Reviewed

1. Armed Forces Health Surveillance Center. Incident Diagnoses of Cancers and Cancer-related Deaths, Active Component, U.S. Medical Surveillance Monthly Report. Vol. 19(6), June 2012. Pages 18-22.
2. Centers for Disease Control and Prevention. Investigating Suspected Cancer Clusters and Responding to Community Concerns: Guidelines from CDC and the Council of State and Territorial Epidemiologists. MMWR 2013. 62(RR08).
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Industrial Hygiene

A review of available industrial hygiene documentation, as required by the Navy's Safety and Occupational Health Program Manual (OPAVINST 5100.23G CH-1 of 21 Jul 2011), Chapter 8 – Occupational Health, was performed and the results are presented in this section.

Industrial hygiene is the science of anticipating, recognizing, evaluating, and controlling workplace conditions that may cause workers' injury or illness. Industrial hygienists use environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering, work practice controls, and other methods to control potential health hazards. Industrial hygiene surveys are conducted to accurately assess worker exposures to chemical, physical and biological agents in the workplace and provide recommendations for their reduction or elimination. Periodic workplace evaluations are made to assure the effectiveness of the implemented controls and determine the need for continued medical surveillance.

Documents Reviewed

The following industrial hygiene-related documents were reviewed:

19. January 2003 Asbestos and Lead Survey, Bldg. AV29
20. June 2003 Asbestos and Lead Survey, Bldg. AV34
21. September 2004 Asbestos and Lead Survey, Bldg. AV32
22. 2008 Indoor Air Quality (IAQ) Survey, Expeditionary Legal Commissions (ELC) Trailer #4
23. 2013 Habitability Assessment Report for Bldgs. ELC 3, AV29 and AV34
24. 2015 Camp Justice Air Sampling Data for Benzene (see Appendix B)

Findings

3. Based on review of the documents, walk-through and air sampling data, it was determined, in concurrence with the 2013 NMCPHC Habitability Assessment Report, that the buildings of concern are habitable for occupancy. Low hazard and administrative worksites have little potential for overexposures to current occupational health standards.
4. There was no Baseline Industrial Hygiene Survey to review for Camp Justice.
5. Asbestos Surveys conducted by NS GTMO Public Works Department (PWD) Environmental in 2003 and 2004 identified asbestos containing material (ACM) in buildings AV29, AV32 and AV34 at Camp Justice. Visual inspections of all spaces were conducted by the team within Camp Justice, and it was determined, in concurrence with PWD Environmental, that the ACM identified is non-friable, and is generally non-hazardous if it is undisturbed. There was no documentation that identified whether

ACM at Camp Justice is assessed annually to ensure it remains in safe condition. "Management in place" is a permissible response action under current regulations.

6. There was visual determination that paint was deteriorating on the exposed underside of the roof in AV32 hangar. Paint chips were observed lying on the deck. This material should be assumed to be lead based paint until otherwise tested.

Existing Data Gaps

The following data gaps were identified:

1. There was no Baseline Industrial Hygiene Survey for Camp Justice.
2. Updated asbestos inspections for Camp Justice in accordance with Asbestos Hazard Emergency Response Act (AHERA) (currently working this issue with CNRSE).
3. Implementation of an Operations and Maintenance Plan (O&M) for all existing ACM.
4. Updated 2004 lead inspection report for Camp Justice (currently working this issue with CNRSE).

Recommendations

1. USNH GTMO to coordinate with JTF GTMO to determine assets available to conduct a baseline industrial hygiene survey of Camp Justice.
2. NAVFAC to update the current asbestos and lead survey and coordinate with the NS GTMO Asbestos Program Manager to either develop or include Camp Justice in the current O&M ACM plan.

Drinking Water

As part of the overall environmental investigation of the water being provided to Camp Justice, an investigation of the water being provided to specific facilities on Camp Justice was conducted. Naval Station Guantanamo Bay drinking water systems are part of the overseas drinking water program in accordance to CNIC 5090.3. The investigation was conducted according to Chapter 3 of the current Final Governing Standards for Cuba (1994), DoDI 4715.05-G - Overseas Environmental Baseline Guidance Document Chapter 3, OPNAVINST 5090.1D Chapter 21 and 34, CNICINST 5090.1, CNICINST 5090.3, CNIC Memorandum 5200 Ser N4/13U84375 2 AUG 13, NAVMED P-5010 – Chapter 5, and TB MED 577/NAVMED P-5010-10/AFMAN 48-138. The following is a survey and the review of documents obtained during the investigation.

The inspection included a physical inspection of the distribution system, storage facilities, and equipment used as well as an examination of operation and maintenance practices, interviews with Public Works Department, Air Force engineering team, Army and USNH GTMO Preventive Medicine and Industrial Hygiene personnel, and a review of compliance records and other relevant documents.

Documents Reviewed

25. 2012 Drinking Water Sanitary Survey
26. 2001 – 2014 Water Quality Information – Consumer Confidence Reports-Guantanamo Bay, Cuba
27. Chapter 3 of the current Final Governing Standards for Cuba (1994)
28. OPNAVINST 5090.1D Manual Chapter 21: Safe Drinking Water Act Compliance Ashore
29. OPNAVINST 5090.1D Manual Chapter 34 : Overseas Environmental Compliance Ashore
30. MEMORANDUM – CNIC Policy for Fit for Human Consumption & Public Notification for Navy Overseas Drinking Water Program
31. NAVMED P-5010-5 – Water Supply Ashore
32. BUMEDINST 6240.10B – Standards for Potable Water
33. CNICINST 5090.1 – U.S. Drinking Water Quality Standards for U.S. Navy Installations Overseas
34. CNIC INSTRUCTION 5090.3 – Navy Overseas Drinking Water Program Ashore
35. TB MED 577/NAVMED P-5010-10/AFMAN 48-138_IP – Sanitary Control and Surveillance of Field Water Supplies
36. Joint Task Force Preventive Medicine Monthly Summaries
37. Joint Task Force Sanitation Inspection 4 June 2015
38. Joint Medical Group Water Logs 2015, 2014, and 2012

Drinking Water System Overview

The NS GTMO is divided into two distinct areas by the Guantanamo Bay; the airfield on the Leeward side and the main base on the Windward side. The entire installation is served by a single water treatment and distribution system. There are no other water sources at any location throughout the installation, according to all officials interviewed.

The source water for the Windward Desalination Water Treatment Plant (WTP) (Figure 3) is drawn from seawater from Guantanamo Bay. Seawater is brought in from a screened pipe located approximately 200 feet from shore and at a 40-foot depth. Chlorinated seawater is pumped to six reverse osmosis (RO) treatment trains. The WTP serves an approximate population of 6,000 with an average daily demand of one million gallons per day. The plant is operated under a Base Operating Service (BOS) contract.

During this assessment, and as part of the 2015 Sanitary Survey of NS GTMO, interviews and a site visit of the WTP were conducted with installation NAVFAC personnel that are involved with the drinking water program. The personnel included: [redacted] Environmental Program Director, and [redacted] Utility Energy Manager. It was noted that at the

Desalination WTP facility all six (6) trains of the reverse osmosis system are fully operational. Additionally, discussion of water operations at Camp Justice was conducted with the Air Force 474th Expeditionary Civil Engineering Squadron, JTF Guantanamo Base Engineer Emergency Force (BEEF) team onsite. The personnel included: and

Findings

1. All drinking water supplied to Camp Justice and associated structures are supplied by the NS GTMO installation drinking water system. This drinking water is considered fit for human consumption (FFHC) as per CNIC Memorandum 5200 Ser N4/13U84375 2 AUG 13 (Determination of Fit for Human Consumption and Public Notification for the Navy Overseas Drinking Water Program).
2. A Navy overseas drinking water system is approved as fit for human consumption if it meets the required primary drinking water standards which are the health based EPA Maximum Contaminant Levels (MCLs) as defined in host Final Governing Standards (FGS), and CNICINST 5090.1. Demonstration of compliance will be verified through the submission of water quality compliance data, via the Overseas Drinking Water (ODW) database, to the Installation Water Quality Board (IWQB) and a record of decision made by the Installation Commanding Officer. This decision is maintained on the ODW database and verified through site visits and inspections by the Regional Water Quality Board (RWQB) and the Water Quality Overseas Council (WQOC). Water is distributed throughout Camp Justice facilities in a three distinct ways. Table 3 shows methods of drinking water connections at specific locations. Below are the three methods currently employed:
    a. Water delivered via hard plumbing connections directly from drinking water risers (Figure 4).
    b. Water delivered via portable drinking water hoses connected to fire hydrants receiving water from the installation drinking water supply (Figure 5).
    c. Water delivered via portable drinking water hoses connected directly to drinking water risers (Figure 6).

Note: All drinking water risers are installed and maintained by installation NS GTMO PWD personnel and/or their BOS contractor.

3. Records/water logs provided by NS GTMO, USNH Preventive Medicine, and JTF Preventive Medicine appear to show no exceedances of water quality standards as required by CNICINST 5090.1.

4. Camp Justice is supplied with three backflow devices. It could not be confirmed if they have been tested or are currently providing required protection. The devices are part of Centerra's BOS Contractor assets and there are no test records or data to support testing, repair or operation.
5. There are water bladders for the latrine units (Figure 7). They are filled by water from the distribution system then isolated from the system. Once the 500 gallon bladder is filled the water is used in the latrine units only to flush the commodes and supply the hand wash stations within the latrine unit. Their function is to ensure the two containment boxes, which hold 360 gallons each, do not overfill and create a raw sewage overflow or spillage situation.
6. Review of the NS GTMO 2012 Sanitary Survey drinking water system deemed the water FFHC. However, system deficiencies were noted in the survey. Status of deficiencies was reviewed during the most recent 2015 Sanitary Survey conducted by NAVFAC in July 2015. This report is being generated at this time. In discussion with (CHMM,UM Water Program Manager), the NAVFAQ HQ Public Works representative who participated as the team lead for the 2015 Sanitary Survey concluded that the water supplied is FFHC. However, there were numerous repeat discrepancies identified during the 2015 Sanitary Survey.
7. Signs were found throughout Camp Justice facilities indicating “Do Not Drink the Water”. Personnel were not able to explain why these signs were posted to indicate the water was not to be consumed (Figures 8 and 9).
8. Tent Latrines are supplied with drinking water via hoses from drinking water risers (Figure 6). These hoses have been connected by the BEEF team to a bladder system to control pressure to toilets, urinal troughs and hand sinks in the latrine tents. The showers within these latrines are separately connected to the drinking water systems (Figure 10).
9. Building AV32 (hangar) is being supplied drinking water via drinking water riser (Figure 11). Restroom trailers (Figure 12) located on the exterior of the southeast end of AV32 are supplied with water from this riser which is connected by a one inch hose to a spigot without a backflow prevention device (Figure 13).
10. Building AV32 had a bulk ice machine (Figure 14) being supplied water from the drinking water riser. The filter attached to the unit is in need of maintenance and exchange (Figure 15).

Building	Connection	Main Line Attachment
AV-34	Hard Plumbed	Direct to Drinking Water Main
AV-29	Hard Plumbed	Direct to Drinking Water Main
ELC	Hose	Hydrant 256 Connected to Main
Marshall Tent	Hose	Hydrant 253 Connected to Main
Tented Latrines	Hose	Installation Drinking Water Riser
Tented Laundry	Hose	Installation Drinking Water Riser
Portable Units Cuzcos	Hard Plumbed	Installation Drinking Water Riser

Table 5: Camp Justice Drinking Water System Connections

Existing Data Gaps

1. Laboratory analysis of representative sampling locations at Camp Justice to ensure water being supplied meets the National Primary Drinking Water Standards as set forth in OPNAV 5090.1D, Chapter 21.
2. Verification if hoses and appurtenances being used in the water system distribution currently being used meet NSF 61 standards (Drinking Water System Components - Health Effects).
3. Information on the existence of a cross-connection and backflow prevention control programs.

Recommendations

1. Preliminary assessments of the drinking water system and review of records provided would indicate the water being supplied to various locations of Camp Justice may be FFHC. Immediate exceptions due to lack of information would be the tent latrine handsinks, the Marshalls Tent, and all hand sinks located at the Expeditionary Legal Complex (ELC). Both these locations are being supplied water via potable drinking hoses connected to hydrants which are connected to the NS GTMO drinking water supply. However, due to the lack of laboratory analysis within Camp Justice, and the continued use of above ground portable hoses throughout the tented portion of the camp, the drinking water to ELC, Marshall's tent and all tent latrines cannot be declared FFHC without, a comprehensive review and testing of all backflow prevention devices, and assurance that any and all devices connected to the installation water supply are intended for drinking water and meet NSF standard 61.
2. Recommend expansion of NAVFAC Public Works to include one or two locations with Camp Justice on their routine required compliance sampling.
3. Recommend that USNH and JTF Preventive Medicine personnel collaborate to ensure Public Health Drinking Water Surveillance for the installation incorporates additional locations throughout Camp Justice.

4. Recommend all significant deficiencies noted in the 2012 Sanitary Survey and the 2015 Sanitary Survey (when released) be addressed expeditiously.
5. Recommend disconnecting all hoses from hydrants and connecting directly to available installation drinking water risers. If hoses are used they must meet NSF 61 drinking water equipment standards.
6. Ensure all hoses and drinking water equipment (e.g., couplers, etc.) meet NSF 61 drinking water equipment standards and are intended for the distribution of drinking (potable) water (Figures 16 and 17).
7. Recommend hard plumbing of all drinking water supply, to include but not limited to, all hand sinks and showers to all portions of Camp Justice currently being fed by above ground hoses.

Drinking Water System Photos

Figure 3: Desalination Water Treatment Plant

Figure 4: Drinking Water Risers

Figure 5: Water via Fire Hydrants

Figure 6: Drinking Water Risers to Tent Latrines

Figure 7: Water Bladders

Figure 8: Nonpotable Sign #1

Figure 9: Nonpotable Sign #2

Figure 10: Drinking Water Hoses to Tents

Figure 11: Drinking Water Risers to AV 32

Figure 12: AV32 Restroom Trailers

Figure 13: AV32 Spigot without Backflow Prevention Device

Figure 14: AV32 Bulk Ice Machine

Figure 15: AV32 Bulk Ice Machine Water Filter

Figure 16: Hoses/Drinking Water Equipment #1

Figure 17: Hoses/Drinking Water Equipment #2

Habitability

The Camp Justice habitability assessment included a survey of environmental factors and conditions which may be affecting the habitability of living and working structures. The assessment identifies and evaluates past and present activities that could have a harmful effect on active duty and civilian personnel working and living on the site. The assessment considered onsite and offsite environmental hazards and the respective health impact those hazards may have on the current long-term operations of the camp and AO Patriot.

Camp Justice functions as the life support area for the ELC and OMC administration buildings. Sixty-one soft shelter tents are constructed on the longest of three asphalt runways and serve as overflow berthing for non-governmental organization personnel, commission liaison officers, media and public affairs, OMC personnel and other transient personnel. The shelter system is roughly 20' X 32' with a floor area of 640 square feet and a berthing capacity of six personnel per tent. The tents are constructed of reinforced polyvinyl chloride coated polyester and erected on a wood frame. Each tent is equipped with an environmental control unit (ECU) and light fixtures. An additional 12 soft shelter tents designated for male and female shower and latrine facilities and two laundry tents are centrally located within Camp Justice. The BEEF occupies 20 similar tents which are used for camp administration; supply; maintenance; utility management; morale, welfare and recreation and occupational workshops.

In addition to the many soft shelter tents, there are 38 non-expandable rigid wall shelters with two single person shelters connected by a shared shower and latrine. The two-room trailers are approximately 24' X 11', which includes the shared latrine and shower area. Walls, floors and ceilings are easily cleanable and all are in good repair. A cluster of 25 ridged walled shelters are constructed on the north end of Camp Justice and off the runway with the remaining 13 ridged walled shelters located at the extreme north end of the runway. All rigid walled shelters are elevated 6-8 inches off the ground and framed with a foundation skirt that extends from the shelter to the ground. The rigid shelters are arranged and connected by a constructed wood deck and overhead awning that serves as a pathway for transit and egress and weather protection.

Defense and prosecuting attorneys, civilian and military, are housed in one of several base housing communities. A habitability assessment of those areas is beyond the scope of this report.

Findings

Power Generation

The camp depends on the NS GTMO power grid, which consists of one power generation plant that produces three-phase, 60 cycle AC current using four generators. The base produces 350,000 kilowatt hours of electricity per day. Four wind turbines produce an additional 950 kilowatts of electricity daily. A portable power distribution unit feeds electrical power to each tent.

Sewage Collection System

Camp Justice has an on-site sanitary sewage system but the system is not in working order. Wastewater generated from showers and latrine tents is collected and pumped via above ground lateral surface lines that converge at a main wastewater line that caries waste to two vented wastewater collection bladders. The number of gallons per day discharged depends on the fluctuating camp population. Wastewater discharged into the bladders are pumped daily by the contractor responsible for base operational support and transferred to the NS GTMO distributed wastewater treatment system. Effluent is discharged in accordance with the Overseas Environmental Baseline Guidance Document for NS GTMO.

Solid Waste / Refuse Collection and Disposal

Refuse is collected in large steel roll-away bins positioned in various locations throughout the camp. Solid waste and refuse is disposed of at the landfill located near the northwest edge of NS GTMO where air curtain incinerators (burn boxes) are used to manage garbage generated from various waste streams. Visual emissions testing and atmospheric dispersion modeling determined that the burn boxes were not in compliance with emission limits. Reportedly, there is no program in place to minimize the waste streams by sorting solid waste for recycling and reutilization.

Potable Water and Distribution System

Bottled water is the primary source of drinking water for Camp Justice occupants and workers. Treated water supplies are received from the NS GTMO reverse osmosis / desalinization plant and are plumbed to the shower tents, latrine tents and rigid shelters by a combination of hard, above ground plumbing and flexible potable water hoses connected from stand-up potable water risers at distal ends of the camp. Water distributed at Camp Justice is used for hygiene purposes only. Regardless of whether the field water standards or overseas water quality standards are applied, water used for hygiene must meet potable water standards and/or be fit for human consumption. See Section 2 – Public Health Review (PHR) Evaluations for a more

detailed description of the water treatment, capacity, distribution system, compliance testing and potable water surveillance for NS GTMO and Camp Justice.

Above and Underground Fuel Storage Tanks

This information is awaiting clarification from NS GTMO.

Overall Habitability Assessment for Camp Justice

Both the soft and rigid walled shelters are appropriately designed and well suited for their intended purpose. Furthermore, the camp design and layout are appropriately planned based on the available documentation of environmental factors and known features of the site, the location, area requirements, availability of potable water, quality and accessibility of shower and latrine facilities and related support facilities, and method of wastewater and refuge disposal. No structural, design or sanitation deficiencies were noted during the assessment.

Expeditionary Legal Complex and OMC Buildings

The ELC and OMC buildings (AV32, AV34, AV31 and AV29) are administrative and workspaces designated for direct support of the military commissions. Visual inspections for mold, asbestos containing material and associated workplace hazards for the ELC and OMC buildings are addressed in the Industrial Hygiene section of this report. The water distribution and uses within these structures are described in the Drinking Water Program section of this report.

Potential Exposure Pathways Based on Site Survey of AO Patriot

Exposure pathway analysis considers identified sources of contamination, movement through environmental media, a point and route of human exposure, and a receptor population. Potentially complete exposure pathways were assessed for specified areas of concern where environmental hazards exist or may have existed and exposure is likely. Data for this preliminary exposure assessment was compiled from the assessment team's site survey, interviews with knowledgeable persons, direct observations, and a review of historical information where available. Outdoor environmental sampling was not conducted during the assessment. However, if future sampling is conducted, it should be concentrated at locations dictated by specific site conditions, and where exposure to potential environmental hazards is most likely to occur based on site history (e.g., Airfield and associated industrial activities), and at locations where there are completed exposure pathways for camp occupants.

This preliminary site survey specifically relates to the assessment of apparent existing environmental conditions at AO Patriot and Camp Justice at the time of the assessment. Moreover, the team's observations are limited in time and location and should not be considered a complete assessment of all potential occupational and environmental health hazards that personnel may encounter at this location. To reduce the uncertainty regarding the

potential for environmental hazards and the associated exposure pathways for the respective deployment site, environmental sampling is recommended. Prior to future sampling another site screening survey should be conducted to validate observations made in this report or JTF GTMO Preventive Medicine personnel should be contacted to assess changes in the environmental conditions at AO Patriot and Camp Justice. Finally, detailed physical and visual observations of adjacent and adjoining areas of AO Patriot to identify offsite sources of contamination and to recognize environmental hazards in connection with those properties were not possible due to time constraints.

Offsite Areas of Concern

The landfill and emissions released by the burn boxes are definite sources of past and current offsite releases of environmental contaminants based on a review of historical information, physical observation, and interviews with knowledgeable persons. Exposure to burn box emissions depends on the distance of the landfill from the camp, air curtain efficiency, meteorological conditions, quantity and type of pollutant discharged, and rate of emission. Distant transport of pollutants from the source is possible under certain environmental conditions. This may cause exposure to a vast array of air pollutants. The lack of documented previous environmental assessments and sampling data prohibits a complete inventory of all activities of concern in adjacent offsite areas. The presence of active light industrial operations (specifically the water treatment plant and power generation plant) adjacent to Camp Justice necessitates further evaluation to determine potential pollution sources and potential health impacts to US personnel.

Potential Onsite Area of Concern

Based on the past use of the site as an active airfield and the typical associated fueling and maintenance activities, and out of an abundance of caution, all efforts should be taken to assess the likelihood of fuel spills and other contaminant releases to the environment proximate to the populated areas of AO Patriot. Although there were no visual indications of a current or past fuel spill / release at or near AO Patriot, it would be prudent to conduct additional investigation. Nothing of significance was noted during the site survey and no historical record was presented to document past fuel releases on or near AO Patriot. However, a large fuel release would present a potentially complete exposure pathway to personnel working and living onsite. Dermal contact during spill control, contact to grossly contaminated soil during camp construction, and / or contact secondary to recreational activities could have led to dermal absorption of the various organic compounds (VOC) found in jet fuel. If a fuel spill did occur, and if the release had been in the vicinity of berthing and working areas of Camp Justice, the ELC or the permanent OMC structures, it may introduce a potential VOC inhalation exposure via vapor intrusion into structures constructed on the

ground. Vapor intrusion into the berthing spaces by soil-gas pathway is possible, but indeterminate based on limited data.

Environmental Surveillance, Sampling and Site Assessment for AO Patriot

Available environmental sampling results, past base camp assessments and related environmental assessments were reviewed for a greater understanding of past and current environmental hazards that may have a harmful impact on the health of personnel living and working in AO Patriot.

Joint Chiefs of Staff Memorandum on Procedures for Deployment Health Surveillance and DoD Instruction 6490.03 require occupational and environmental health (OEH) surveillance activities are to be conducted to identify recognizable environmental and occupational conditions in connection with the deployment / operational site that may impact the health of deployed forces, US personnel, contractors and all other personnel. The goal of OEH is to evaluate potential health risks associated with identified exposures to environmental contaminants, occupational hazards, disease vectors and other harmful environmental conditions so that appropriate remedial action can be taken to protect the health and safety of all personnel living and working at Camp Justice and the adjacent facilities of the ELC and OMC buildings.

Documents Reviewed

A review was completed of the Military Exposure Surveillance Library (MESL) (unclassified and classified applications) and the Defense Occupational and Environmental Health Readiness System (DOEHRS) Industrial Hygiene for all data, reports, surveys, and other documentation relating to OEH surveillance onboard NS GTMO. Although not specifically an OEH activity, a visible emissions (VA) testing study on the air curtain incinerators (burn boxes) and atmospheric dispersion modeling was conducted to estimate pollutant concentrations at specified public receptor locations resulting from the burn boxes operating at the landfill.

1. Deployment Environmental surveillance, Assessment of Ambient Air Particulate Matter Less than 10 microns (PM10) Sampling, Camp X-Ray, Cuba, 7 January 2002. Ten (10) PM10 samples collected and analyzed.
2. Deployment Environmental surveillance, Assessment of Ambient Air Particulate Matter Less than 10 microns (PM10) Sampling, Camp X-Ray, Cuba, 10 June 2004. Fifteen (15) PM10 samples collected and analyzed.
3. Deployment Occupational and Environmental Health Risk Characterization, Ambient Air Particulate Matter Less than 10 microns (PM10) Sampling, Naval Station Guantanamo Bay, Cuba, 13-15 May 2008. Three (3) PM10 samples collected and analyzed.
4. Deployment Environmental Surveillance, Water and Soil Assessment, Camp X-Ray, Guantanamo Bay, Cuba, 15 April 2002. One (1) water sample and six (6) soil samples collected and analyzed.

5. Deployment Environmental Surveillance, Water Assessment, Camp X-ray, Guantanamo Bay, Cuba, 18 April 2002. One (1) water sample was collected and analyzed.
6. Preliminary Industrial Hazard Assessment, Naval Station Guantanamo Bay, Cuba, 21 December 2001 (SECRET)
7. Phase I Deployment Occupational and Environmental Health Site Assessment, Guantanamo Bay Cuba, March 2006 (SECRET)
8. Phase I Deployment Occupational and Environmental Health Site Assessment, Guantanamo Bay, Cuba, January 2013 (SECRET)
9. Camp Justice Sanitation Assessments Conducted by JTFGTMO Preventive Medicine personnel. Four (4) completed; 9 October 2014, 5 November 2014, 4 June 2015 and 6 July 2015.
10. Visual Emissions (VE) Testing and Atmospheric Dispersion Modeling Report for Naval Station Guantanamo Bay, Cuba, December 2012.

Findings

1. None of the air, soil or water samples were collected near Camp Justice or AO Patriot. The soil samples and two water samples were collected in 2002 and 2003 near the northeast quadrant of NS GTMO where the former Camp X-Ray was located and before the OMC was established. Exposure guidelines and operational risk assessments are taken from the US Army Technical Guide 230, Environmental Health Risk Assessment and Military Exposure Guidelines (TG 230). See Table 5 for a summary of environmental samples collected at NS GTMO.

Sample Type	Date Sampled	Operational Risk and Discussion	MESL Identifier
Deployment Water Kit (1) sample	2002/02/22	LOW/MARGINAL for boron and LOW for pH, bromoform and dibromochloromethane which exceeded applicable guidelines	1841N
Deployment Water Kit (1)	2002/03/26	MODERATE for turbidity due to possible microbiological contamination and boron at 15 liters per day consumption rate	94735N
Soil (6)	2002/02/18-22	LOW; no samples exceeded applicable guidelines	1854N
PM10 (10)	2002/02/14-18	LOW; no samples exceeded applicable guidelines for particulate matter of metals	94734N
PM10 (15)	2002/02/19-2002/03/17	LOW; PM10 levels observed should not pose adverse health effects to a military population over an estimated deployment of 1-year or less. No metals were detected above analytical reporting limits.	1854N
PM10 (3)	2008/05/13-15	MODERATE; PM10 sample concentration was 358-545 micrograms per cubic meter. This concentration falls within the range believed to pose significant health concerns for susceptible groups. Generally healthy US Forces may experience eye, nasal and throat irritation causing little to no impact on unit readiness.	51702N

Table 6: Environmental Samples Collected at NS GTMO

2. None of Camp Justice sanitation inspections reviewed noted significant findings.
3. Findings from the Industrial Hazard Assessment (2001) and two Deployment Occupational and Environmental Health Site Assessments conducted in 2006 and 2013 respectfully can be reviewed on the classified Military Exposure Surveillance Library (MESL) portal.
4. Results from the VE testing and dispersion modeling study show that while the air curtain incinerators do not meet the 10% opacity limit, and fail to comply with the OEBGD for NS GTMO, there does not appear to be adverse health effects at any of the public receptor locations located within the populated sectors of NS GTMO based on the modeling data.

Existing Data Gaps

1. Environmental baseline surveys (EBS) and/or past environmental surveys for NS GTMO were unavailable.
2. Comprehensive OEH sampling for AO Patriot had not been conducted.
3. Although two Occupational and Environmental Health Assessments (OEHSA) were conducted in 2006 and 2013 neither followed an acceptable standard for identifying and documenting environmental hazards at NS GTMO or JTF GTMO combined areas of operation. The assessments failed to link potential areas of concerns and potential contaminating activities to exposure pathways. OEH sampling would help determine exposure point concentrations and validate completed exposure pathways.

Recommendations

1. Perform an EBS, OEHSA (based on the multi-service tactics, techniques and procedures (MTTP) for conducting deployment occupational and environmental health assessments), or a similarly rigorous standard practice for conducting environmental health site assessments. The goal of an EBS, OEHSA or similar method for conducting the environmental health site assessment should be to determine if there are completed onsite or off site pathways of exposure for chemicals of concern that could be related to past industrial chemicals, usage, storage or disposal practices.
2. Characterize AO Patriot by conducting environmental sampling to include at a minimum ambient air sampling for VOCs, metals and particulate matter less than 2.5 microns in diameter (PM2.5), soil sampling, and water to assess the potential for vapor intrusion into work and living spaces.
3. Incorporate continuous OEH surveillance into health service support (HSS) and Force Health Protection (FHP).
4. Limit soil excavations in uncharacterized areas to minimize inhalation and dermal exposure caused from potential soil contamination.
5. Conduct a complete environmental audit for NS GTMO

Risk Communication

Risk communication is the exchange of information and opinions, and establishment of an effective dialogue, among those responsible for assessing, minimizing, and regulating health and environmental risks, and those stakeholders who may be affected by the outcomes of those risks. Accordingly site specific public health activities need to be developed to ensure that messages and strategies designed to prevent exposure, adverse human health effects, and diminished quality of life are effectively communicated to the stakeholders.

Virtually every day, public health risk communication is needed somewhere in the Department of the Navy. Whenever this occurs, leaders, environmental and public health specialists, and public affairs must be ready to provide information to help people make the best possible decisions for their health and well-being. This section provides a framework of principles and approaches relevant to the communications of health risk information to both internal and external stakeholders.

Risk Communication Training

It is critical that those personnel dealing with the health and environmental aspects of this public health investigation be knowledgeable and skilled in risk communication. Therefore, on 5 August 2015, NMCPHC provided Risk Communication training to key personnel from Naval Station Guantanamo Bay, Joint Task Force Guantanamo (JTF GTMO), Office of Military Commissions, and U.S. Naval Hospital Guantanamo Bay. This training included discussions on the protocol NMCPHC is using to investigate the DoD IG complaint of excess cancers from Camp Justice environmental exposures, risk communication as it applies to public health aspects of suspected cancer clusters, and the standard risk communication process by which information should be disseminated to stakeholders as this investigation proceeds to the roll out of the final investigation results.

Town Hall Meeting

The standard method by which public health information during an investigation is shared with both internal and external stakeholders includes webpage (official and Facebook) postings, Fact Sheets, Frequently Asked Questions, press releases and Town Hall type meetings. NMCPHC is already working with BUMED, CNIC, CNRSE and NS Public Affairs on development and release of all public health content. It is highly recommended that the final results of the investigation be presented at a Town Hall Meeting at the NS. NMCPHC will provide risk communication training and preparation for personnel (e.g., subject matter experts) conducting the Town Hall Meeting.

Cancer Clusters and Public Perceptions

According to the Centers for Disease Control and Prevention, cancer is the second leading cause of death in the United States, with one in four deaths attributable to some form of cancer. Approximately one in two men and one in three women will have some form of cancer in their lifetime. Because cancer is so common, cases might appear to occur with alarming frequency within a community even when the number of cases is within the expected rate for the population. As the U.S. population ages, and as cancer survival rates continue to improve, in any given community, many residents will have had some type of cancer, thus adding to the perception of an excess of cancer cases in a community. Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and such lifestyle behaviors as diet and smoking. Also, a statistically significant excess of cancer cases can occur within a given population without a discernible cause and might be a chance occurrence.

So, together with these considerations, risk perception of cancer and cancer clusters becomes very important in discussions between health professionals and employees. Appendix A (Cancer Clusters and Risk Communication) is provided for the awareness of employees and to facilitate discussions between health professionals and employees.

Section 3 – Additional Issues

NS Gitmo - Solid Waste Disposal and Air Curtain Incinerators

Findings

NS Gitmo currently uses an air curtain incinerator (burn box) for use at the landfill. The air curtain portion of the incinerators is not functional and compliance monitoring is not being performed. Monitoring was performed in 2012 as part of a Visual Emissions testing and Atmospheric Dispersion Modeling Report when the air curtains were functional. The units were not in compliance with the emissions limits at that time. It appears, based on available documentation that this is operating now as an open burn pit, not in compliance with the OEBGD (DODI 4715.05) Chapters 7 (Solid Waste Requirements - C7.3.12.5 and C7.3.13) and Chapter 2 (Air Emissions), which is prohibited.

Recommendations

Recommend expediting the repair of the air curtain (already under consideration by CNRSE). In addition, in lieu of requesting an exemption from SOUTHCOM to continue to operate the burn box, consider installation of emissions compliant incinerators to avoid open burning and the potential impacts on human health, and future liability (e.g., Burn Pit Registry) associated with burn boxes.

Data Gaps and Recommendation for Environmental Sampling

During the preliminary on-site evaluation, a walk-through was conducted, data gaps were assessed and sampling was performed for benzene in the air. Prior to conducting the visit, limited historical occupational and environmental documentation for Camp Justice was available. Additionally, there was limited information regarding former operations that occurred onsite (e.g., hangar, flight line, etc.) and/or potential spills or releases to the environment (e.g., locations of Underground Storage Tanks, spills associated with the airstrip or work processes in the hangar). Minimal additional documentation was received during the on-site preliminary evaluation; however, the visit did assist in the identification of data gaps.

The air sampling conducted, while on-site (Industrial Hygiene in Section 2 – Public Health Review [PHR] Evaluations), used a NIOSH method for sample collection because industrial hygiene monitoring equipment and sampling media were readily available. The NIOSH method used has a much larger detection limit than standard EPA methods used to conduct risk assessments. As a result, the data obtained cannot be readily compared with EPA risk-based screening values or used to conduct a risk assessment. Additionally, different fuels are

comprised of different amounts of benzene, and the absence of benzene in air samples is not a reliable indicator that constituents from fuels are not a potential air concern. While the sampling conducted for benzene provides some additional data, it does not provide sufficient information to address the air pathway of exposure.

Based on the limited available historical site information, there is insufficient information to adequately address the potential environmental exposures to carcinogens alleged in the complaint. The individual sections of this report identify specific data gaps to address the allegations. It is recommended that additional technical discussions occur with CNRSE, NAVFAC, NMCPHC and others to develop a sampling plan to address data gaps. The additional discussions will further define the specific pathways of exposure, media to be sampled and locations to be sampled.

Among those organizations providing occupational (e.g., industrial hygiene) and environmental (drinking water program) support services to Camp Justice (e.g., JTF GTMO, NS GTMO), there appears to be uncertainty regarding what exact occupational and environmental standards (and monitoring) apply (Expeditionary or Fixed Naval Installation). Admittedly this is confusing as Camp Justice is Expeditionary however; it is located on, and surrounded by, a Fixed Naval Installation. Moving forward, for simplicity, continuity of services and recordkeeping, we recommend NS GTMO provide those occupational and environmental services (and standards) as they would for any other tenant command.

Finally, once additional environmental data is collected by CNRSE, and a human health risk assessment report is completed by NMCPHC, NMCPHC recommends posting this report to the NS GTMO Webpage and conduct Town Hall Meetings to roll out the results to the stakeholders (internal and external).

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Appendix A: Cancer Clusters and Risk Communication

Cancer Clusters and Public Perceptions

According to the Centers for Disease Control and Prevention, cancer is the second leading cause of death in the United States, with one in four deaths attributable to some form of cancer. Approximately one in two men and one in three women will have some form of cancer in their lifetime. Because cancer is so common, cases might appear to occur with alarming frequency within a community even when the number of cases is within the expected rate for the population. As the U.S. population ages, and as cancer survival rates continue to improve, in any given community, many residents will have had some type of cancer, thus adding to the perception of an excess of cancer cases in a community. Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and such lifestyle behaviors as diet and smoking. Also, a statistically significant excess of cancer cases can occur within a given population without a discernible cause and might be a chance occurrence.

Definition of a Cluster

Information below is from: CDC. Cancer clusters. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at http://www.cdc.gov/nceh/clusters/about.htm.

The Centers for Disease Control and Prevention (CDC) define a cancer cluster as a greater than expected number of cancer cases that occurs within a group of people in a geographic area over a defined period of time. This definition can be broken down as follows:

- *a greater than expected number:* Whether the number of observed cases is greater than one typically would observe in a similar setting (e.g., in a cohort of a similar population size and within demographic characteristics) depends on a comparison with the incidence of cancer cases seen normally in the population at issue or in a similar community.
- *of cancer cases:* The cancer cases are all of the same type. In rare situations, multiple cancer types may be considered when a known exposure (e.g., radiation or a specific chemical) is linked to more than one cancer type or when more than one contaminant or exposure type has been identified.
- *that occurs within a group of people:* The population in which the cancer cases are occurring is defined by its demographic factors (e.g., race/ethnicity, age, and sex).
- *in a geographic area:* The geographic boundaries drawn for inclusion of cancer cases and for calculating the expected rate of cancer diagnoses from available data are defined carefully. It is possible to "create" or "obscure" a cluster inadvertently by selection of a specific area.

- *over a period of time:* The time period chosen for analysis will affect both the total cases observed and the calculation of the expected incidence of cancer in the population.

Characteristics of Cancer and Clusters

Information below is from the CDC. Morbidity and Mortality Weekly Report (MMWR): Investigating Suspected Cancer Clusters and Responding to Community Concerns: Guidelines from CDC and the Council of State and Territorial Epidemiologists; September 27, 2013 / 62(RR08); 1-14. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6208a1.htm:

- The National Cancer Institute (NCI) of the National Institutes of Health (NIH) defines cancer as a term for a group of diseases in which abnormal cells divide without control and can invade nearby tissues. As a group, cancers are very common. Cancers are the second leading cause of death in the United States, exceeded only by diseases of the heart and circulatory system. One of every four deaths in the United States is attributable to some form of cancer. In 2009, approximately 1.47 million persons in the United States received a cancer diagnosis, and approximately 568,000 persons died from cancer.
- Because cancer is common, cases might appear to occur with alarming frequency within a community even when the number of cases is within the expected rate for the population. As the U.S. population ages, and as cancer survival rates continue to improve, in any given community, many residents will have had some type of cancer, thus adding to the perception of an excess of cancer cases in a community. Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and such lifestyle behaviors as diet and smoking. Also, a statistically significant excess of cancer cases can occur within a given population without a discernible cause and might be a chance occurrence.
- Three considerations are important for suspected cancer cluster investigations. First, types of cancers vary in etiologies, predisposing factors, target organs, and rates of occurrence. Second, cancers often are caused by a combination of factors that interact in ways that are not fully understood. Finally, for the majority of cancers, the long latency period (i.e., the time between exposure to a causal agent and the first appearance of symptoms and signs) complicates any attempt to associate cancers occurring at a given time in a community with local environmental contamination. Often decades intervene between the exposures that initiate and promote the cancer process and the development of clinically detectable disease.
- Communicating effectively about the frequency and nature of cancer in explaining suspected cancer clusters can be difficult for public health agencies, and many of the scientific concepts involved (e.g., random fluctuation, statistical significance and latency

period) might not be easy to explain to the community. Any number of community members, friends, or relatives with cancer is alarming and is too many from a personal perspective. When persons are affected personally by a case of cancer, they naturally seek an explanation of the cause of the cancer.

Cancer Cluster Investigations

- As the 1990 Guidelines noted, finding a causal association between environmental contaminants and cancer is rare in a community cancer cluster setting. Evidence reported by state and local health agencies and federal agencies since 1990 that would suggest otherwise is limited, and most investigations of suspected cancer clusters do not lead to the identification of an associated environmental contaminant.
- State and local health agencies receive approximately 1,000 inquiries per year regarding suspected cancer clusters. The majority of these inquiries can be resolved during the initial response, which consists of the initial contact and follow-up contact with the caller, if needed. The resulting health education can be an important public service. Even if inquiries concern events that meet the statistical criteria for a cancer cluster, investigations of suspected cancer clusters are unlikely to find an associated environmental contaminant. For example, one of the largest suspected cancer clusters investigated by CDC's NCEH and by other agencies concerned cases of childhood leukemia in Fallon, Nevada. Although initial analysis demonstrated a statistically significant ($p<0.05$) increase in the number of cases, subsequent epidemiologic investigations did not identify a statistically significant association with environmental contaminants.
- Suspected cancer clusters that consist of cases of one type of cancer, a rare type of cancer, or a type not identified usually in a certain demographic group are thought to be more likely to have a common cause. Even if these factors are present, the suspected cluster might not be associated with an environmental exposure and in fact might be a chance occurrence. A type of cancer under investigation might not be associated biologically with any environmental contaminants of concern in the community. In other words, a suspected environmental contaminant might not be in the causal pathway for a certain type of cancer. One common but false assumption held by persons not familiar with the scientific study of cancer is that a single environmental contaminant is likely to cause any or all kinds of cancer. Toxicological and epidemiologic studies do not support this assumption. Cancer is not one disease, but rather many different diseases with different causal mechanisms.
- In addition, two statistical issues influence the ability of the health agency to determine an association between the cancer(s) in question and environmental exposures. First, a suspected cancer cluster investigation with a small number of cases (e.g., one that

involves a rare cancer type comprising only a few cases) might result in a lack of statistical power to detect an association. Second, because of the substantial number of cancer patients who might live in a community, a spurious association with an environmental contaminant can occur by chance alone, without the contaminant being a causal factor.

- The health agency should avoid imprecise and post hoc definitions of such concepts as case, population, geographic area, or exposure period because such definitions might bias or limit an investigation. For example, case definitions that include different cancers generally are not useful, unless the environmental contaminant under consideration has been associated with multiple cancer types.
- Latency and change of residence add to the complexity of these investigations. Because of the long latency period associated with cancers, behaviors and exposures that might have contributed to the development of cancer in a person typically occur years to decades before the diagnosis (e.g., malignant mesothelioma, a lung tumor, is associated with asbestos exposure). The latent period between first exposure to asbestos and death from mesothelioma is often 30 years or longer. Latency needs to be considered in an investigation of a suspected cancer cluster because it influences the exposure period relevant to the investigation. If a person with cancer did not live in the suspected cancer cluster area during the relevant exposure period (possibly 20 years previously), then that person's cancer cannot be related to an environmental contaminant of concern or to any exposure in the suspected cancer cluster area. Conversely, the latency period might limit the ability to detect a cancer cluster or identify cancers related to an environmental exposure that occurred in the past. In a mobile population, a cancer cluster resulting from an environmental contamination occurring years or even decades earlier might go undetected because exposed residents have moved away from the community before the cancer develops. Thus, as persons move in and out of different communities, their cumulative exposure profile will change.
- Because investigations rarely demonstrate a clear association with an environmental contaminant, investigations of community-based cancer clusters usually do not provide the resolution communities seek.

Where can people get more information about cancer clusters?

In addition to state and local health departments and cancer registries, the following agencies may have more information about cancer clusters.

Agency for Toxic Substances and Disease Registry (ATSDR)
Centers for Disease Control and Prevention
1–800–232–4636 (1–800–CDC–INFO)
http://www.atsdr.cdc.gov

The CDC's ATSDR conducts public health assessments of potentially hazardous waste sites, performs health consultations on specific hazardous substances, designs and conducts health surveillance programs, and provides education and training about hazardous substances. Information about public health assessments conducted by ATSDR can be found on its *Public Health Assessments and Health Consultations* page. Reports can be searched by state or U.S. territory. Contact information for ATSDR regional offices is available online.

National Center for Environmental Health (NCEH)
Centers for Disease Control and Prevention
1–800–232–4636 (1–800–CDC–INFO)
cdcinfo@cdc.gov
http://www.cdc.gov/nceh/clusters

The CDC's NCEH works to promote healthy and safe environments and prevent harmful exposures. The NCEH website includes general information about cancer clusters, links to resources, and answers to frequently asked questions.

National Institute for Occupational Safety and Health (NIOSH)
Hazard Evaluation and Technical Assistance Branch
Health Hazard Evaluation (HHE) Program
Centers for Disease Control and Prevention
513–841–4382
HHERequestHelp@cdc.gov
http://www.cdc.gov/niosh/hhe

The HHE Program of CDC's NIOSH investigates potentially hazardous working conditions, including suspected cancer clusters. Employees, authorized employee representatives, and employers can request these evaluations. HHE reports are available on the NIOSH website.

Office of Occupational Medicine
Occupational Safety and Health Administration (OSHA)

U.S. Department of Labor

202–693–2323

http://www.osha.gov/dts/oom/index.html

OSHA's Office of Occupational Medicine performs workplace-related case evaluations and cluster investigations, including medical record reviews, employee interviews, and medical screening activities.

Selected References

1. Centers for Disease Control and Prevention. Investigating Suspected Cancer Clusters and Responding to Community Concerns: Guidelines from CDC and the Council of State and Territorial Epidemiologists. *Morbidity and Mortality Weekly Report* 2013;62(RR08):1-14.

[PubMed Abstract]

Appendix B: Industrial Hygiene Indoor Air Sampling for Benzene

Introduction

As requested, NMCPHC performed a Preliminary Public Health Review of the alleged exposure to carcinogens of personnel working at the DoD Office of Military Commissions "in an area surrounding the commisions' trailers, tents, office, and courtrooms." The commissions' main facilities (the Expeditionary Legal Complex and Camp Justice) are located on the runway of the former McCalla airfield, which was in service from about 1941 to 2000 (no definitive records available). Overflow and support facilities are located on a hill above the runway. Aircraft which operated on the runway included piston engine, jet, and turboshaft rotary wing aircraft, which used both aviation gasoline and JP-5 fuel.

Due to the long service life of the airfield, it is very likely that spilled or leaked fuel is present in the ground under the airfield. The geological material under the airstrip is very porous (coral and marl), and the water table is reported (no documentation available) to be at least 35 feet below the surface. Benzene is a component of all gasoline blends, but only a tiny fraction is typically found in JP-5. Benzene is of greater health concern than other volatile organic compounds (VOCs) found in aviation fuels because it is a known human carcinogen. Old "weathered" fuels may lose lighter volatile components, such as benzene, faster than "heavier" constituents. Because of these considerations, the absence of benzene in air samples is not a reliable indicator that other VOCs are not present.

Methods

The NIOSH occupational health methodology that was used for sampling benzene has inherently higher detection levels than those required for conducting EPA risk assessments. It is recommended that future sampling efforts be conducted using EPA methods that inherently have lower detection levels which can be used for risk assessment purposes.

Industrial hygienists from the NMCPHC conducted a preliminary survey for benzene in indoor air at Camp Justice on 8 August 2015. Sampling was performed in all spaces that were identified as occupied by Defense personnel and a representative number of spaces occupied by Prosecution and Commission personnel (see Table 6 for a list of sample locations).

Eighteen samples were collected in pre-manufactured buildings (ELC-2, ELC-3, ELC-4 and ELC-8) in the Expeditionary Legal Complex (ELC) and in permanent structures (AV29, AV31, AV32, and AV34). Samples were collected on standard charcoal tubes and analyzed by gas chromatography in accordance with OSHA method 7. Samples were delivered to the Navy

Comprehensive Industrial Hygiene Laboratory (CIHL) in Norfolk, Virginia, an American Industrial Hygiene Association (AIHA) certified laboratory.

LOCATION	TASK	STRESSOR NAME	SAMPLE NO./DATE	SAMPLE TIME	RESULT (mg/m³/ppm)
ELC-2	Administrative	Benzene	NE15-0001 8/8/15	53 minutes	<0.3850/<0.1205
ELC-2	Administrative	Benzene	NE15-0002 8/8/15	53 minutes	<0.3850/<0.1205
ELC-4	Administrative	Benzene	NE15-0003 8/8/15	54 minutes	<0.3817/<0.1195
ELC-4	Administrative	Benzene	NE15-0004 8/8/15	52 minutes	<0.4069/<0.1274
ELC-3	Administrative	Benzene	NE15-0005 8/8/15	46 minutes	<0.4651/<0.1456
ELC-3	Administrative	Benzene	NE15-0006 8/8/15	44 minutes	<0.4640/<0.1452
ELC-8	Administrative	Benzene	NE15-0007 8/8/15	52 minutes	<0.4069/<0.1274
ELC-8	Administrative	Benzene	NE15-0008 8/8/15	55 minutes	<0.3749/<0.1174
BLANK	N/A	Benzene	NE15-0009 8/8/15	N/A	<4.0 µg
BLANK	N/A	Benzene	NE15-0010 8/8/15	N/A	<4.0 µg
AV34 Court Rm	Administrative	Benzene	NE15-0011 8/8/15	50 minutes	<0.4188/<0.1311
AV34 Court Rm	Administrative	Benzene	NE15-0012 8/8/15	50 minutes	<0.4278/<0.1339
AV34 Room	Administrative	Benzene	NE15-0013 8/8/15	50 minutes	<0.4020/<0.1258
AV34 Room	Administrative	Benzene	NE15-0014 8/8/15	49 minutes	<0.4184/<0.1310
AV29 Room	Administrative	Benzene	NE15-0015 8/8/15	47 minutes	<0.4598/<0.1439
AV29 Room	Administrative	Benzene	NE15-0016 8/8/15	48 minutes	<0.4386/<0.1373
AV34 Rm	Administrative	Benzene	NE15-0017 8/8/15	49 minutes	<0.4184/<0.1310
AV34 Rm	Administrative	Benzene	NE15-0018 8/8/15	49 minutes	<0.4124/<0.1291
BLANK	N/A	Benzene	NE15-0019 8/8/15	N/A	<4.0 µg
BLANK	N/A	Benzene	NE15-0020 8/8/15	N/A	<4.0 µg
AV31 Main Rm	Administrative	Benzene	NE15-0021 8/8/15	48 minutes	<0.4167/<0.1304
AV31 Cell	Administrative	Benzene	NE15-0022 8/8/15	48 minutes	<0.4328/<0.1355

Table 7: Results of Air Sample at Camp Justice

Results

The laboratory reported that benzene was not detected in any of the samples. All results were below the limit of quantification (LOQ) of 4 micrograms (4 µg) per sample, which equates to 0.4 milligrams per cubic meter (0.4 mg/m3) for a ten liter sample.

Discussion

The current survey was conducted with the goal of rapidly screening the OMC spaces for plausible carcinogenic inhalation hazards. The OSHA 7 method was selected because it uses standard industrial hygiene equipment and materials which were readily available.

The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) for benzene is 1 part per million (ppm) as an eight hour time weighted average (TWA), or 5 ppm as a 15 minute short term exposure limit (STEL). The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) is 0.5 ppm (1.6 mg/m3) as an 8-hour TWA and 2.5 ppm (8 mg/m3) as a 15 minute STEL. The PELs (regulatory standards) and TLVs (advisory only) are set to limit occupational exposures such that workers can be exposed for a working lifetime (40 years) without excess risk of adverse health effects. The sample results are all below the benzene PELs and TLVs.

The Environmental Protection Agency (EPA) Reference Concentration (RfC) for Chronic Inhalation Exposure is 0.03 mg/m3. The RfC is an estimate of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfC is slightly more than one order of magnitude lower than the limit of quantification for the samples collected in this survey.